Intergovernmental Oceanographic Commission
Reports of Governing and Major Subsidiary Bodies

IOC Committee on International Oceanographic Data and Information Exchange

Twenty-fourth Session

Kuala Lumpur, Malaysia, 28-31 March 2017

UNESCO

IOC/IODE-XXIV/3
Oostende, 5 April 2017
Original: English *

Abstract

The IOC Committee on International Oceanographic Data and Information Exchange held its Twenty-fourth Session (IODE-XXIV) at the Renaissance Hotel Kuala Lumpur, Kuala Lumpur, Malaysia between 28 and 31 March 2018. The Session was preceded by a 1-day scientific workshop on 27 March 2017. The IODE Session was attended by 67 participants from 31 IOC Member States and 5 Organizations. The Session adopted 4 decisions (+ 2 draft decisions for the IOC Assembly) and 6 recommendations. The decisions concerned (i) the establishment of a new IODE management structure (replacing the IODE officers; (ii) project and activity performance evaluation procedures; (iii) the establishment of an inter-sessional working group to finalize a concept paper on the IOC data and information system (ODIS); and (iv) revision of the terms of reference for the IODE QMF to accommodate the ADUs. In addition, draft decisions were prepared for the IOC-XXIX regarding the IOC strategic plan for data and information management (2017-2201) and for the IOC communication and outreach strategy for data and information management. The 6 recommendations concern (i) revised terms of reference of the Joint IODE/IAMSLIC GE-MIM in a transitional capacity; (ii) the renewal of the MoU for the IOC Project Office for IODE, Oostende, Belgium; (iii) the establishment of a new pilot project OBIS-EVENT-DATA; (iv) the ODINWESTPAC project; (v) the IODE Associate Information Units (AIUs); and (vi) the IODE work plan and budget for 2017-2019. The Committee re-elected Ms Cynthia Chandler (USA) and Mr Yutaka Michida (Japan) as IODE Co-Chairs.

* An executive Summary of this report is available in English, French, Russian and Spanish.

Group photo IODE-XXIV, Kuala Lumpur, Malaysia

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ANNEXES

1. OPENING

1 Ms Cyndy Chandler and Mr Yutaka Michida, Co-Chairs of the IOC Committee on International Oceanographic Data and Information Exchange (IODE) welcomed the participants to the Twenty-fourth Session of the IODE Committee at 09:00 on Tuesday 28 March 2017. Ms Chandler also thanked the members of the Committee for their agreement to use English as the only working language for the Session, considering the cost of interpretation and translation.

2 Mr Michida recalled briefly the scientific conference that was held on the previous day, 27 March. He reported that the Conference had been conducted in 3 sessions with about 80 participants. Session 1 addressed the IODE contribution to the IOC medium-term strategy and SDGs; Session 2: Innovative initiatives in ocean data and information management; and Session 3: IODE and capacity development: how can we better support the IOC regions' capacity development needs. Each session included 2 to 6 presentations and was followed by a panel discussion with questions from the floor. He highlighted that the discussions included the IODE's possible contributions to global policies having considered current emerging issues such as SDGs, SIDS, Climate Change, Sendai Framework for Disaster Risk Reduction, BBNJ…, and that they also covered wide spectra of issues from highly strategic points to technical aspects. He pointed out that, based on the discussions at the workshop, IODE needed to consider how we could meet these emerging requirements, not only scientific ones, but also socio-economic problems, and in addition those pointed out by the IOC audit report. He concluded that the workshop was certainly a very good opportunity for IODE to improve its visibility at the national and regional level.

3 Ms Chandler then introduced the IODE Achievement Awards ceremony that was held on 27 March 2017. She informed the Committee that awards had been given to Ms Arame Ndiaye Keita (Senegal) in recognition of her outstanding contributions to the development of marine information management capacity in Africa, and a posthumous award to Prof Mario Ruivo (Portugal) for his early support in 1987 to the development of ocean data and information management capacity that had led to ODINAFRICA. In this regard, the Committee observed a minute of silence to commemorate Prof Ruivo.

4 The meeting was then addressed by the representative of the local host, Mr Zaharuddin Mohd Maideen, and by the IOC Executive Secretary, Dr Vladimir Ryabinin. Their addresses are attached as Annex V to this Report. It was reminded that the formal opening of the Session had been held the previous day, 27 March 2017.

2. ADMINISTRATIVE ARRANGEMENTS

2.1 ADOPTION OF THE AGENDA

5 The Committee was invited by the Technical Secretary, Mr Peter Pissierssens, to review and adopt the provisional agenda (**Document IOC/IODE-XXIV/1 prov.**) available from the web site on http://www.iode.org/index.php?option=com_oe&task=viewEventAgenda&eventID=1879 . The agenda is available as Annex I to this Report. The Committee was requested to note that all working documents were made available only as on-line documents. Any new items or issues proposed by the Meeting were noted here and discussed either under the related Agenda Item or under Agenda Item 9.

6 **The Committee adopted** the agenda including the additional item 9.1

2.2 DESIGNATION OF A RAPPORTEUR

7 Mr Pissierssens invited the Committee to elect a Rapporteur for the Session. It was recalled that for the past four sessions the Secretariat was tasked to report on the meeting and that no rapporteur was used.

8 **The Committee**, taking into account the limited size of most delegations, **decided not to nominate a Rapporteur**, and **tasked** the Secretariat and Co-Chairs with the reporting of the Meeting.

2.3 SESSION TIME TABLE AND DOCUMENTATION

9 The Committee was invited to review and adopt the Timetable (**Document IOC/IODE-XXIV/1 Add. Prov.)**

10 The IODE Technical Secretary (Mr Peter Pissierssens) then reviewed the arrangements for the Session and presented **Document IOC/IODE-XXIV/2.3**. (***List of Documents***, attached as Annex IV to this Report) available on line through http://www.iode.org/iode24

11 He then informed the Committee about the working hours for the Session and other details relevant to the conduct of the Session. He reminded the Committee that this Session had 3.5 working days to deal with the substance of the meeting. Accordingly, there would be no time for extensive introductions of agenda items and participants were urged to carefully read the Action Paper and working documents in preparation for the Session.

12 Nevertheless, participants introducing agenda items could provide brief PowerPoint presentations if they so desired while considering the time-limits shown in the provisional timetable (indicated times are presentation + discussion).

13 **The Committee adopted** the timetable for the Session.

2.4 ESTABLISHMENT OF SESSIONAL WORKING GROUPS

14 The Technical Secretary invited the Committee to establish sessional working groups. Suggested groups included:

(i) sessional working group on work plan and budget;
(ii) sessional working group on the follow up to the IOC audit (agenda item 6.2.1);
(iii) sessional working group on the IODE communication and outreach strategy (agenda item 6.3)
(iv) sessional working group on IODE's response to SDG-14 (agenda item 3.5.2.2)
(v) sessional working group on IIOE-2 (agenda item 3.5.6)
(vi) sessional working group on the IODE CD implementation plan (agenda item 4.1)

15 The Technical Secretary reminded the Committee that participants had been invited to identify the need for additional sessional working groups by email, prior to the Session. He informed the Committee of received suggestions.

16 He reminded the Committee that each Sessional Working Group should nominate a Chair who would report back to the Committee at the time the relevant agenda item is discussed in plenary.

2.5 LOCAL ARRANGEMENTS

17 Information and guidelines for participants were made available through the IODE-XXIV web pages through http://www.iode.org/iode24.

18 The local host representative informed the Committee on local arrangements.

3. REPORT ON THE PAST INTER-SESSIONAL PERIOD (2015-2016)

19 This agenda item was introduced by Ms Cyndy Chandler, Co-Chair.

3.1 PROGRESS REPORT ON THE IODE-XXIII WORK PLAN

20 This agenda item was introduced by Ms Cyndy Chandler, Co-Chair. She referred to **Document IOC/IODE-XXIV/3.1** (***Progress Report on the IODE-XXIII Work Plan***). She recalled that IODE-XXIII had adopted 4 decisions and 5 recommendations. She noted that the work plan included 72 action items of which 31 were fully implemented, 24 had reported no action, 7 were partially completed and the remaining needed clarification. Ms Chandler requested those responsible for the action item to report further under the relevant agenda item. Regarding the specific activities included in the work plan and budget table (Recommendation IODE-XXIII.5) Ms Chandler reported that 67% of the 2015 activities were implemented, while 75% of the 2016 activities were implemented. Ms Chandler also recalled that the Officers, during their meeting in Oostende, Belgium between 20-22 January 2016 had reviewed progress and had adjusted the work plan and budget to optimize implementation. The report of the 2016 IODE Officers meeting was available as **Document IOC/IODE-Off-2016/3**.

3.2 REPORTS OF THE IODE GROUPS OF EXPERTS

21 This agenda item was introduced by Ms Cyndy Chandler, Co-Chair. She recalled that IODE-XXIII had discussed abolishing two Groups of Experts (GE-BICH and GE-OBIS), leaving two: The JCOMM/IODE Expert Team on Data Management Practices (ETDMP) and the IODE/IAMSLIC Group of Experts on Marine Information Management (GE-MIM). As these Groups are joint groups with other Organizations it was noted that they could not be abolished without agreement of the other Partner. It was noted further that the future of the Groups of Experts would also be discussed under agenda item 6.1.

22 Ms Chandler invited the Chairs of the Groups of Experts to report. She noted that the approval of any proposed work plan and budget would be dependent on the proposed future of the Groups of Experts.

23 Ms Chandler also recalled that the previous Sessions had discussed the abolishing of the GE-BICH and GE-OBIS but had not done so formally.

24 **The Committee decided** to formally abolish the IODE GE-BICH and IODE GE-OBIS.

3.2.1 JCOMM/IODE Expert Team on Data Management Practices (ETDMP)

25 This agenda item was introduced by Dr Sergey Belov, Chair JCOMM/IODE ETDMP. He referred to **Document IOC/IODE-XXIV/3.2.1** ***(Joint JCOMM/IODE Expert Team on Data Management Practices)***. He also referred to agenda item 6.1 regarding the possible abolishing of the Group.

26 Dr Belov explained that the JCOMM/IODE Expert Team on Data Management Practices focuses on adopting or developing principles and practices for the end-to-end data management processes, also including required data management best practices and standards for such subjects as metadata, common codes, vocabularies, etc. These data practices include tools and services developed under IODE projects such as Ocean Data Portal, Ocean Data Standards and Best Practices Project (ODSBP), OceanExpert, and OBIS. ETDMP also assists the development of tools and services within the Ocean Data Portal project to better serve the development of a distributed data network according to the end-to-end data managing principles, including data provider and end-user levels. ETDMP

also investigates and proposes adoption of internationally endorsed metadata standards.

27 Dr Belov informed that during the last inter-sessional period the Group continued to review submitted proposals for ODSBP; established connections with potential new data providers (projects, programmes and other communities) such as WMO WIS, GOOS, EMODNet, GEOSS, etc.; developed the document on interoperability and migration of the ODP metadata into the ISO 19139 encoding; assessed contributions from existing data providers; provided delivery and support for ODINAFRICA ODP regional node established in KMFRI (Kenya); continued coordination of Partnership Centre activities to support and update existing ODP regional nodes (SNDM, ODINWESTPAC) and ODP global node; compiled a list of new standards of metadata and netCDF data templates.

28 **The Committee acknowledged** the accomplishments of the JCOMM/IODE Expert Team on Data Management Practices (ETDMP).

29 **The Committee,** supported by JCOMM**,** and considering the benefits of cooperation with JCOMM through the ETDMP, **recommended** the continuation of the JCOMM/IODE ETDMP.

30 **The Committee invited** Member States to actively liaise with JCOMM/IODE ETDMP on standards and best practices, metadata management and the exchange of data, information and services.

3.2.2 IODE/IAMSLIC Group of Experts on Marine Information Management (GE-MIM)

31 This agenda item was introduced by Ms Linda Pikula, Chair IODE/IAMSLIC GE-MIM. She referred to **Document IOC/IODE-XXIV/3.2.2**. (***IODE Group of Experts on Marine Information Management***). She also referred to the work of the inter-sessional working group to propose a re-structuring of IODE (agenda item 6.1) in general and to the proposed creation of “Associate Information Units” as a new IODE structural element (see agenda item 6.1.1).

32 Ms. Pikula recalled that GE-MIM was formally established at IODE-XI, New York, 9-18 January 1984 through Recommendation XI.4 and subsequently modified to the Joint IODE/IAMSLIC GE-MIM established by IODE-XXII, 2013 through Recommendation IODE-XXII.1.

33 In addition to highlighting the membership, she recalled that the objective of this Group of Experts in Marine Information Management are to:

(i) advocate marine information managers as essential partners in the knowledge cycle that includes observation, management, sharing and product/service provision contributing to the marine related decision making process;

(ii) advise the IODE Committee on the policy, development and further implementation of an effective international system for scientific and technical information about the marine environment by keeping user requirements under continuing review and ensuring that these requirements can be met adequately;

(iii) identify the policy, technical and financial issues involved in the development and implementation of marine information systems, and make recommendations concerning their solution;

(iv) develop activities and information products to improve the capability of the marine information management community, particularly within developing countries, to benefit from and participate in marine information systems and keep the marine information management community informed on how they might best have access to such systems through the application of new technology.

34 **The Committee adopted** Recommendation IODE-XXIV.1 “REVISED TERMS OF

REFERENCE OF THE JOINT IODE/IAMSLIC GROUP OF EXPERTS ON MARINE INFORMATION MANAGEMENT IN A TRANSITIONAL CAPACITY".

35 **The Committee requested** that a new MoU should be established between IOC and IAMSLIC covering the next inter-sessional period.

3.3 STATUS OF THE IODE NETWORK

36 This agenda item was introduced by Ms Cyndy Chandler, Co-Chair referring to **Document IOC/IODE-XXIV/3.3.1a** (***Status of the IODE Network: Part 1: Data Management***) and **Document IOC/IODE-XXIV/3.3.1b**. (***Status of the IODE Network: Part 2: Marine Information Management***).

37 She recalled that IODE-XXII had adopted, through Recommendation IODE-XXII.17 three structural elements of IODE: (i) National Oceanographic Data Centre (NODC; (ii) IODE Associate Data Unit (ADU); and IODE Global Data Assembly Centre (IODE GDAC).

38 She reported that the IODE network currently (December 2016) includes 63 National Oceanographic Data Centres and 20 Associate Data Units. No GDACs have been established so far. She noted that the IOC currently has 148 Member States.

39 She recalled that two NODCs were accredited by IODE-XXIII (China and Belgium). Two new applications for accreditation were received and approved during the inter-sessional period (France and Islamic Republic of Iran).

40 The following 6 ADUs were added during the inter-sessional period: (i) Marine Science Centre, University of Basrah, Iraq (2015); (ii) Oceans Past Initiative, Lisbon, Portugal (July 2015); (iii) Parques Nacionales Naturales de Colombia, Bogota, Colombia (October 2015); (iv) Fundación Universidad de Bogota Jorge Tadeo Lozano, Magdalena, Colombia (October 2015); (v) Marine and Coastal Research Institute (INVEMAR), Santa Marta, Colombia (October 2015); (vi) Conservation of Arctic Flora and Fauna (CAFF), Akureyri, Iceland (October 2015).

41 Ms Chandler informed the Committee that it had been decided by the IODE Officers to use an online survey to obtain reports from NODCs, ADUs and marine librarians, as had been done for 2007-2008, 2009-2010 and 2011-2012. The survey was opened on 21 September 2016 and closed on 21 October 2016. The aforementioned working documents summarized the results of the two Surveys.

42 The IODE Officers decided to use an online survey (similar to the approach taken since 2007) to obtain reports from NODCs, ADUs and marine librarians. The survey was active between 21 September and 21 October 2016. Sessional working documents IODE-XXIV/3.3.1a and IODE-XXIV/3.3.1b, prepared by Mr. Peter Pissierssens, provide detailed results based on the survey responses. Highlights of the results were presented in a few slides and summarized by the IODE Co-chairs, Ms Cyndy Chandler and Prof Yutaka Michida.

43 Document 331a applies to the STATUS OF THE IODE NETWORK, Part 1: Data Management. A total of 66 responses (represents a 49% response rate) were received out of 134 total possible contacts representing National Oceanographic Data Centres (NODCs) and IODE Associate Data Units (ADU's) from Member States. The ADUs also include several OBIS (Ocean Biogeographic Information System) nodes. The survey results show that the IODE Network has grown steadily since 1961, and establishing ADUs in 2013 has added to that growth. OBIS nodes have started to formally request recognition as ADUs, thereby extending the IODE Network. Forty (60%) of the 66 responses said that their country and/or data centre had a documented data management strategy, and 63% said that their data centre had its own data policy. The additional information provided by many of the respondents to this survey question included the URL link to their published data policy available online. Nearly 41% (n=27) said they had a documented Quality Management

System (QMS) with a majority further stating that they followed the ISO 9001 Open Archival Information System (OAIS) model, and 14 that actually hold ISO 9001 certification. It was encouraging to see that 50% said they planned to apply for IODE QMF during the next inter-sessional period (2017-2018). It was good to see that 45 of the 66 respondents are able to make data freely available online.

44 Document 3.3.1b applies to the STATUS OF THE IODE NETWORK, Part 2: Marine Information Management. A total of 27 valid responses were received of a possible 35. The response rate of 77% is quite high, but it is worth noting that 35 IODE national coordinators for marine information management is a considerable decline from the high of 53 in 2011-2012. This 23-question survey was divided into 5 sections. It was very encouraging to see that 100% of the survey respondents said they had entered their information into OceanExpert. The survey showed that 44% of them worked at a research institution library with 25% at a national oceanographic library. Twelve reported an increase in staff, and 5 reported a decrease over the past 2 years. Regarding their budget allowances compared with 2013-2014: 11 remained the same, 3 increased, and 5 decreased. Nine responses said they would be able to provide a 'visiting expert' to the IOC Project Office for up to 3 months (provided travel and local expenses were covered by IODE) in the next inter-sessional period.

45 **The Committee welcomed** the positive results regarding the status of the IODE Network as well as the suggestion from JCOMM to also present the results of the survey at the upcoming 5th JCOMM session (25-31 October 2017, Indonesia).

46 Regarding the issue of GDACs Ms Chandler recalled that no GDACs had been established during the inter-sessional period. She noted that there appeared to be some confusion regarding the terms of reference of the IODE GDACs (as documented in Recommendation IODE-XXII.13 and those of the JCOMM GDACs. Several experts had requested that IODE and JCOMM should harmonize the terms of reference in order to avoid further confusion which had hampered formal applications to become a GDAC.

47 **The Committee**, after comparing the IODE and JCOMM GDAC Terms of Reference with the objective to harmonize them, **recommended** to re-define the Terms of Reference of an IODE GDAC (see item 3.5) and a suggestion was made to involve the ETDMP members in this effort.

3.3.1 RENEWAL OF THE MOU BETWEEN THE FLANDERS MARINE INSTITUTE AND IOC REGARDING THE IOC PROJECT OFFICE FOR IODE

48 This agenda item was introduced by Mr Peter Pissierssens, Head of the IOC Project Office for IODE, referring to **Document IOC/IODE-XXIV/3.3.1c**.

49 He recalled that the first Memorandum of Understanding (MoU between UNESCO/IOC and the Flanders Marine Institute regarding the UNESCO/IOC Project Office was signed on 19 December 2005. The establishment of the Office was formally approved by the twenty-second Session of the IOC Assembly through Resolution XXII-7. The Terms of Reference (Article I) of the Office were defined as follows: (i) to establish a creative environment facilitating the further development and maintenance of IODE projects, services and products with emphasis on improving the efficiency and effectiveness of the data and product/service stream between the stage of sampling and the user; (ii) to assist in strengthening the capacity of Member States to manage oceanographic data and information (by organizing relevant training and the capacity building related activities) and to provide ocean data and information products and services required by users; (iii) to liaise and maintain links with relevant UNESCO/IOC programmes and other projects as relevant to the projects implemented by the UNESCO/IOC Project Office for IODE; (iv) to establish and maintain links with other relevant organizations, institutions and programmes in order to promote cooperation with the UNESCO/IOC Project Office for IODE. The initial agreement had a

duration of four years (1 January 2006 – 31 December 2009) but this term was in fact extended up to 30 April 2012. The second MoU was established covering the period 1 May 2012 to 31 December 2016. Under this agreement VLIZ contributed: (i) offices, meeting and conference rooms with an approximate floor space of not less than 1100 m2; (ii) the cost of utilities (water, power, heating, cooling); (iii) use of a permanent internet connection (broadband, >100 Mb/s upload and download); (iv) the cost of taxes levied on the physical facilities; (v) the cost of maintenance and fire insurance of the building/offices and their content; (vi) an annual financial contribution of not less than €250,000 to be used as a contribution towards the operational expenses and programme activities of the Project Office. The actual annual financial contribution will depend upon the approval of the budget of the Government of Flanders (Kingdom of Belgium) and budget of VLIZ; (vii) not less than three staff FTE who will be made available to the project office through a non-reimbursable loan agreement or equivalent arrangement; and (viii) in-kind technical assistance for the management of the main internet connection (see iii), firewall and servers.

50 In Article V of the 2012-2016 MoU is stated that "An independent performance evaluation of the UNESCO/IOC Project Office for IODE shall be organized once, jointly by UNESCO/IOC and prior to the expiry of this Memorandum of Understanding. The evaluation shall be submitted for approval to the IODE Committee that oversees the Project Office activities. The Committee may, as it deems necessary, recommend the renewal or extension of this agreement and will submit this Recommendation to the next available Session of the IOC Assembly of Executive Council".

51 In June 2016 an assessment was prepared of the performance of the Project Office since its establishment in 2005 (IOC Project Office for IODE: towards a new MoU). This has been combined with elements of the "Impact analysis of VLIZ with focus on the period 2009-2013" commissioned by VLIZ from IDEA consult (2015). These have been combined in the working document IOC/IODE-XXIV/3.3.1c.

52 **The Committee expressed** its great appreciation to the Government of Flanders (Kingdom of Belgium) and the Flanders Marine Institute (VLIZ) for the long-term support provided to the IOC Project Office for IODE, **stressing** that the Office has been crucial for the continuing growth and success of the IODE Programme and IOC in general.

53 **The Committee requested** the Government of Flanders (Kingdom of Belgium) to continue its support, and **invited** other Member States to complement the support to allow further development of the IODE, its activities, products and services.

54 **The Committee adopted** Recommendation IODE-XXIV.2 (THE UNESCO/IOC PROJECT OFFICE FOR IODE IN OOSTENDE, BELGIUM)

3.4 PROGRESS REPORTS OF GLOBAL PROJECTS

55 This agenda item was introduced by Prof Yutaka Michida, Co-Chair. He recalled that during the past Sessions the Committee, as part of its re-organization and abolishing of the Groups of Experts has gradually transformed most IODE activities into projects to arrive at a more results-focused programme where results can be measured and evaluated. Each project, with clear terms of reference, should be managed by a Steering Group with one or two (Co-)Chairs designated by the Steering Group. Some projects may also designate project coordinators and/or technical managers. All member states are welcome to participate in the work of Projects and their Steering Groups. He noted that while projects usually have a starting and ending date, many of IODE's projects have been on-going for many years and possibly the Committee should consider whether all current projects should continue indefinitely or whether end dates should be identified. In addition, projects that should continue may need to be renamed to reflect their permanent character. In this regard reference was made to the work of the inter-sessional working group to propose a re-structuring of IODE (agenda item 6.1).

56 Prof Michida then invited all IODE project Steering Group Chairs to present a brief report on key results and outputs prepared during the past inter-sessional period and to introduce a concise work plan for the next inter-sessional period. He noted that requested budgets would be considered by the sessional working group for work plan and budget considering confirmed revenue from the UNESCO regular programme and extra-budgetary sources. In this regard, he referred to agenda item 7. Finally, Prof Michida requested each presenter to limit his or her presentation to 5 minutes. He also informed the Committee that after each presentation there would be 5 minutes for questions.

57 Under this agenda item the Committee reviewed and approved the proposal work plans of all global project as well as their proposed budget, within the limits of available funds.

3.4.1 Ocean Biogeographic Information System

58 This agenda item was introduced by Dr Eduardo Klein, Chair of the IODE Steering Group for the OBIS project. He referred to **Document IOC/IODE-XXIV/3.4.1** (which includes the annex: OBIS Node Health Status Check and Transition Strategy).

59 He recalled that the overall objective of the project is to be the most comprehensive gateway to the world's ocean biodiversity and biogeographic data and information required to address pressing coastal and world ocean concerns.

60 He reported that the following activities had been implemented during the intersessional period:

(i) two sessions of the SG-OBIS were held (SG-OBIS-V, May 2016 and SG-OBIS-VI, Feb 2017);

(ii) SG-OBIS co-chair Bruno Danis retired and Sky Bristol (USGS/OBIS-USA) was appointed as the new SG-OBIS co-chair at SG-OBIS-V;

(iii) the new OBIS Executive Committee (composed of the SG-OBIS co-chairs, the OBIS secretariat and the chairs of the OBIS task teams) met for the first time (November 2016);

(iv) a cooperation agreement was signed with the Biology & Ecosystems panel of GOOS and the Marine Biodiversity Observation Network (MBON) of GEO BON in December 2016;

(v) four new OBIS nodes were established;

(vi) almost 5 million new records were added to OBIS and OBIS is cited in 192 scientific papers;

(vii) OBIS data is used in 3 chapters of the UN World Ocean Assessment and get its first reference in the UN General Assembly Resolution for its contribution the Marine Scientific Research;

(viii) new OBIS QC tools and OBIS products (e.g. biodiversity indicators) are under development and will support the implementation of the new OBIS-ENV-DATA standard which is published in the Biodiversity Data Journal (January 2017);

(ix) the major focus for the next period will be on building capacity (training the IODE-OBIS network) as well as re-engineering the OBIS infrastructure and technology stack to increase OBIS performance and respond to new and increased requirements and mandates.

(x) those new challenges and increased expectations of OBIS are posing a scalability risk upon OBIS and any new requirements or mandates will need to come with extra resources for the IODE-OBIS network as well as for the central operations.

61 Mr Klein expressed appreciation for (i) in-kind contributions to core OBIS operations

such as those from the Flanders Marine Institute, especially the support on resolving taxonomic name issues by the data management team of the World Register of Marine Species, as well as (ii) JAMSTEC/GODAC for hosting the 6th session of the IODE Steering Group for OBIS and (iii) the generous private donation from Serge Martin to the OBIS special account. He also acknowledged the challenges of managing taxonomic data and the critical contributions from the national OBIS nodes within the Member States. He remarked that OBIS is only as effective as the Member State nodes.

62 He also thanked the OBIS-ENV-DATA pilot project for their excellent work done on the proposed OBIS-ENV-DATA standard for combined biological, environmental, and sampling methodology, published in the Biodiversity Data Journal: https://doi.org/10.3897/BDJ.5.e10989 .

63 He also welcomed the decision of the 193 Parties to the Convention on Biological Diversity (Decision COPXIII/12, December 2016), which requested the CBD to (i) establish a partnership with OBIS to facilitate training opportunities for incorporating new information and new consideration of existing information in future description of areas meeting the EBSA criteria, including both scientific and traditional knowledge and (ii) provide links from the EBSA repository to the data and information from EBSA areas in OBIS.

64 **The Committee expressed** its great satisfaction with the work done by OBIS and noted with appreciation the high-level visibility and public awareness it received.

65 Considering the challenges for IODE/OBIS to respond to the increasing demands on OBIS to support several international processes with the current limited resources it has, **the Committee strongly encouraged** IOC Member States to increase their support to the OBIS secretariat and the national, regional and thematic OBIS Nodes, which they host, that contribute data, technical infrastructure and scientific expertise.

66 **The Committee approved** the OBIS Node health status check and transition strategy for inactive OBIS nodes and **stressed** that the main purpose is not to remove OBIS nodes from the IODE network but to identify and try to solve issues and encourage OBIS nodes to remain active.

3.4.1.1 IODE Pilot Project Expanding OBIS with environmental data (OBIS-ENV-DATA Pilot Project)

67 This agenda item was introduced by Mr Francisco Hernandez, Chair of the IODE Steering Group for OBIS-ENV-DATA. He referred to **Document IOC/IODE-XXIV/3.4.1.1**b.

68 Through the two-year IODE pilot project: OBIS-ENV-DATA (Recommendation IODE-XXIII.4, 2015) a proposed standard and technological solution has been developed for the publication of combined biological and environmental datasets. This was the result of a workshop held at the IODE project office in Oostende on 5-7 October 2015, and subsequent discussion, design, issue resolution, and technical development. The pilot project involved an international network of 11 institutions from 10 countries in North America, South America, Europe, Africa and Oceania.

69 The proposed standard consists of a DarwinCore (Dwc) Event Core in combination with a DwC Occurrence Extension and a proposed enhancement to the DwC MeasurementOrFact Extension. This new structure enables the linkage of measurements or facts - quantitative and qualitative properties - to both sampling events and species occurrences, and includes additional fields for property standardization (using the NERC Vocabulary). The standard also allows to organize, aggregate, and link ocean observation events using "event hierarchy".

70 An open-access paper (https://doi.org/10.3897/BDJ.5.e10989) was published on 9 January 2017 and describes the OBIS-ENV-DATA pilot project evaluation and decision of the proposed standard among other alternatives. The paper provides examples for data from

CTDs and Niskin bottles, Animal Telemetry and a video plankton recorder.

71 The proposed standard has already been brought into production by GBIF. In addition, OBIS has already adapted its harvesting procedures. Finally, all technical aspects and best practices of the standard have to be defined in detail and made available as guidelines in the online OBIS manual (http://iobis.org/manual), which will then be submitted to the IODE Ocean Data Standards and Best Practices project for adoption by IODE. Subsequently, the OBIS nodes and IODE data centres need to be trained. In addition, a data flow to specialized regional and global repositories for abiotic data captured by OBIS could be developed.

72 As the two-year OBIS-ENV-DATA pilot project now ends, Mr Eduardo Klein (OBIS Co-chair) introduced the proposal of a new two-year pilot project called "OBIS Event Data for Science Applications, building on the success of OBIS-ENV-DATA, with the aim to validate and enhance the scientific purposes of developing and using OBIS Event Data with the aim to support data and information product development within the framework of GOOS and the Marine Biodiversity Observation Network (MBON) of GEO.

73 Mr Klein invited OBIS nodes, NODCs and ADUs to express their interest in joining this new pilot project. The development of the first data products and applications based on the OBIS Event data standard and the implementation of technology enhancements and tools as part of the core OBIS data system (and dataset) output is co-funded by DIPS-4 ocean assessment (see topic 3.4.1.2) and through in-kind contributions by OBIS nodes. However, other funding sources will also be sought to support this activity.

74 Mr Appeltans invited Member States to join this effort.

75 **The Committee expressed** its appreciation for the work achieved by the OBIS-ENV-DATA 2-year pilot project, **closed** the project and **agreed** to establish a new 2-year pilot project called OBIS Event Data for Science Applications.

76 **The Committee adopted** Recommendation IODE-XXIV.3 (ESTABLISHMENT OF THE IODE PILOT PROJECT OBIS EVENT DATA FOR SCIENTIFIC APPLICATIONS (OBIS-EVENT-DATA)

3.4.1.2 Development of Information Products and Services for Ocean Assessments (DIPS-4 Ocean Assessments)

77 This agenda item was introduced by Mr Ward Appeltans, project manager DIPS project.

78 Through the DIPS-4-Ocean Assessments (in short DIPS) project (a Flanders' UNESCO Science Trust Fund project), more indicators and products on OBIS data are under development that should support Member States in their reporting obligations on progress towards the Aichi Biodiversity targets. Through DIPS, OBIS also contributes to the 'Global HAB Status Report' (GHSR). GHSR aims to provide an overview of HAB events and their societal impacts; provide a worldwide appraisal of the occurrence of toxin-producing microalgae; and assess the status and probability of change in HAB frequencies, intensities, and range resulting from environmental changes at the local and global scale. The development of this report is intimately linked with the systematic compilation of HAB data in OBIS and the IOC Harmful Algal Event Database (HAEDAT), see agenda item 3.5.2.3.2 HAEDAT).

79 In order to support the creation of new information products several new OBIS data access services have been built throughout the first year, with input from a "hackathon" event organized in December 2015. The newly developed OBIS R package (http://github.com/iobis/robis) and the new OBIS exploration portal (http://www.iobis.org) both run on the newly developed OBIS RESTful JSON API (https://github.com/iobis/api-docs). The R package allows loading OBIS occurrence data and taxon lists directly into the R statistical programming environment for further analysis and the creation of products. The

OBIS data exploration portal provides enhanced access to data and statistics related to geographical areas (EEZ, UNESCO World Heritage marine Sites, EBSAs, ABNJ), taxa, institutes and datasets, and could be used by Member States for national biodiversity reporting.

80 The following products have been developed, with support through a contract with the University of Sheffield:

(i) a tutorial for an R-statistical pipeline to extract and enrich OBIS data with other environmental, geographic, and biological data sets to better understand the distribution and dynamics of marine biodiversity (http://iobis.org/2016/11/22/sorbycollection/)

(ii) a proposed new OBIS visualisation of marine species richness, gaps and completeness. Using Belgium as a test case (http://iobis.org/2016/11/17/completeness/)

(iii) a proof-of-concept on the application of occupancy modelling to extract robust temporal trends for tracking changes in ocean biodiversity and identifying potentially at risk species (http://iobis.org/2016/11/15/occmod/)

81 He noted the difficulty of generating indicators from the heterogeneous data in OBIS, but acknowledged the benefits of work done by a UK NERC PhD student to develop a new tool to assist this activity.

82 Future developments of DIPS-4-Ocean Assessments will include further enhancements of the OBIS exploration portal with inclusion of more statistics (including those listed above) and customized data portals (e.g. HAB, deep-sea, live coral and other GOOS biological and ecosystems EOVs).

83 The JCOMM Co-President expressed her appreciation for the agreement between OBIS and the GOOS BioEco panel to collaborate in managing biological and ecosystem data.

84 **The Committee welcomed** the work achieved.

3.4.2 Global Oceanographic Data Archaeology and Rescue Project (GODAR)

85 This agenda item was introduced by Dr Hernan Garcia. It was noted that, contrary to other IODE projects, the GODAR project has not been led by a Steering Group but by one expert (currently Dr Tim Boyer, previously Dr Sydney Levitus). Dr Garcia referred to **Document IOC/IODE-XXIV/3.4.2*.(Global Oceanographic Data Archaeology and Rescue)***

86 Dr Garcia recalled that the Global Oceanographic Data Archaeology and Rescue (GODAR) project is tasked to identify historic ocean profile data which are not readily available publicly and may be in danger of disappearing from the public record, and adding it to the World Ocean Database (WOD) for preservation and public dissemination. Historic in this context means any data taken more than five years from the present date. The GODAR project added more than 224,000 historic oceanographic profile casts to the WOD over the last two years. These data came in many forms, from digitized original cruise reports from the HMS Challenger cruises of the late 19th century to records of instrumented elephant seals from the still ongoing MEOP (Marine Mammals Exploring the Ocean Pole to Pole) Program. Continued communication with the MEOP program and institutions such as the International Council for the Exploration of the Seas (ICES) has paid off in the addition of many historical data to the WOD.

87 Dr Garcia also highlighted the challenge of rescuing pH data that lack sufficient metadata to properly interpret the results (e.g. lack relevant scale information used when the pH measurements were made).

88 In the next two years GODAR intends to continue and expand communications with oceanographic data centres, as well as research and data programs, to facilitate the continued flow of data from all sources to the WOD. Mr Garcia expressed appreciation for the collaborative efforts with Japan and Canada.

89 IODE is urged to continue to facilitate this communication and continue to remind member states of the great need to provide historic data in danger of obsolescence to the WOD for sustained availability.

90 The GODAR project will also continue to facilitate and directly execute digitization of oceanographic profile data. GODAR will continue to devote resources to this digitization effort and to work closely with atmospheric and marine meteorological data rescue efforts.

91 IODE is urged to provide funding and expertise to this effort, specifically in the case of recently disclosed historic paper records in Argentina and other sources in South America.

92 Ms Pikula reminded the Committee that marine libraries were a possible source of assistance for data rescue efforts, as they have served in this capacity in the past.

93 **The Committee expressed** its appreciation for the work achieved by the GODAR project, **thanked** the US-NODC (now NCEI) for its support to GODAR, and **urged** US-NODC (now NCEI) to continue its support to the GODAR project. **The Committee** also urged all Member States to contribute data to the GODAR project in support of open and unrestricted access to data.

3.4.3 World Ocean Database (WOD)

94 This agenda item was introduced by Dr Hernan Garcia. It was noted that, contrary to other IODE projects, the WODB project has not been led by a Steering Group but by one expert (currently Dr Tim Boyer, previously Dr Sydney Levitus). Dr Garcia referred to **Document IOC/IODE-XXIV/3.4.3.*(World Ocean Database)***

95 Dr Garcia recalled that the World Ocean Database (WOD) project continued to maintain and expand the world's largest unrestricted access uniform format, quality controlled, ocean profile database. More than 1 million oceanographic profile casts, both historic and recent, have been added to the WOD in the last two years, bringing the total number of oceanographic casts to slightly more than 15 million.

96 Regarding recently contributed data, the Argo profiling float programme continued to be the largest contributor. There were also substantial recent data from the Ship of Opportunity (SOOP) expendable bathythermograph (XBT) programme and Conductivity-Temperature-Depth (CTD) and bottle data from oceanographic research cruises.

97 Glider data are becoming the main source of coastal and continental shelf data found in the WOD. Significant interaction with oceanographic data centres around the world continues to augment the WOD holdings, and IOC Member States are encouraged to continue contributing ocean profile data to the WOD project.

98 He noted that the WOD is now available via a THREDDS server which makes it more interoperable with other systems, and more accessible to a wider variety of clients. He also stated that all GODAR data and WDS data are incorporated into the WOD.

99 For the next two years, WOD proposed to continue aggregating recent and historical ocean profile data, enhance quality control procedures, interact with oceanographic data centres, research projects, and other sources of data. The WOD project will continue to work to incorporate more of the numerous glider data into the WOD on a regular basis.

100 The delegate from Germany informed the Committee that the German NODC would send, within the next few weeks, data from approx. 200 research cruises for inclusion in WOD. He also inquired about efforts to deal with 'data de-duplication', especially considering

that data are contributed from multiple sources. Dr Garcia replied that they do have extensive processes to help identify and eliminate duplication.

101 **The Committee expressed** its strong appreciation for the work done on the World Ocean Database (WOD) by the US NODC (now NCEI) and **called** on NCEI to continue its support to WOD.

102 **The Committee invited** IOC Member States to facilitate the flow of data to the WOD and to use Data Object Identifiers (DOIs) for oceanographic profile data, as well as Creative Commons (CC) data use licenses.

103 **The Committee invited** projects and initiatives such as EMODnet, SeaDataCloud, and others, to ensure that their public access oceanographic data are made available freely and without restriction of use and distribution to the IODE community in a timely manner. Such ocean data from these projects and initiatives could be added to and enhance IODE international data products such as the World Ocean Database.

104 **The Committee agreed** that WOD should submit an application to JCOMM to become a Centre for Marine Meteorological and Oceanographic Climate Data (CMOC) in the Marine Climate Data System (MCDS).

105 **The Committee requested** that the IOC should revise the "IOC Oceanographic Data Exchange Policy", and in particular Clause 5 which states "Member States shall, to the best practicable degree, use data centres linked to World Data System, to IODE's NODC and WDC network as long-term repositories for oceanographic data and associated metadata" and replace it with "*Member States shall, to the best practicable degree, use data centres linked to the World Data System and IODE's NODCs, its World Ocean Database and Ocean Biogeographic Information System (OBIS) as long-term repositories for oceanographic data and associated metadata and OBIS in particular for biological and ecosystem data*".

3.4.4 Global Temperature and Salinity Profile Programme (GTSPP)

106 This agenda item was introduced by Dr Charles Sun, Chair of the IODE Steering Group for the GTSPP project. He referred to **Document IOC/IODE-XXIV/3.4.4**.(***Global Temperature Salinity Profile Programme***).

107 He recalled that the objectives of the project are: (i) To provide a timely and complete data and information base of ocean temperature and salinity profile data; (ii) To implement data flow monitoring system for improving the capture and timeliness of real-time and delayed-mode data; (iii) To improve and implement agreed and uniform quality control and duplicates management systems; and (iv) To facilitate the development and provision of a wide variety of useful data analyses, data and information products, and data sets.

108 He reported that during the inter-sessional period the following activities were implemented: (i) Continued GTSPP daily operations to process and preserve both real-time and non-real-time temperature and salinity data and maintained the project web sites at http://www.nodc.noaa.gov/GTSPP / and http://www.meds-sdmm.dfo-mpo.gc.ca/isdm-gdsi/gtspp/index-eng.htm ; (ii) Populated the outcomes of the comparison between observed versus model-simulated temperature data for the North Pacific Region at http://ds.data.jma.go.jp/gmd/gtspp/data/index.html ; (iii) Conducted the second IODE OceanTeacher Academy Training Course on the Use of the Global Temperature and Salinity Profile Programme Data, 8-10 December 2015, Tianjin, China. (iv) Conducted the third (3rd) Session of the GTSPP steering group, 17-18 November 2016, Oostende, Belgium. (v) Reported to the 24th Session of the IODE Committee, 27 – 31 March 2017, Kuala Lumpur, Malaysia, and (vi) Reported to the 9th Session of the joint WMO/IOC JCOMM Ship Observations Team (SOT), 27-31 March 2017, London, UK.

109 **The Committee expressed its appreciation** to Dr Charles Sun and the members of the SG-GTSPP for the work achieved.

3.4.5 Global Ocean Surface Underway Data Project (GOSUD)

110 This agenda item was introduced by Mr Loïc Petit de la Villéon, Chair of the IODE Steering Group for the GOSUD project. He referred to Document IOC/IODE-XXIV/3.4.5. (***Global Ocean Surface Underway Data***).

111 He started by informing the Committee of the passing of Dr Fabienne Gaillard who has been co-chairing GOSUD, giving the Project a strong scientific impulse. The Committee expressed its condolences to the family of Ms Gaillard.

112 He recalled that the initial objectives of GOSUD are (i) to provide near real time sea surface salinity and sea surface temperature data for operational needs, and (ii) to provide delayed mode sea surface salinity for research purposes and for satellite data validation.

113 He mentioned that during the reporting period the GOSUD operations have been successfully conducted. In Situ, Sea Surface Salinity (SSS) and Sea Surface Temperature (SST) data have been collected, quality controlled and distributed in near-real time.

114 He also highlighted that 3 major delayed mode datasets were released after enhanced quality control process and calibration adjustments of the data using collected water samples.

115 He recalled that the Steering Group has been renewed and met in November 2016 in Oostende, Belgium. He mentioned that the GOSUD project plan was adopted during the IX° steering group meeting and that the GOSUD new Steering Group membership reflects the willingness to expand the GOSUD data perimeter to more parameters that SSS and SST.

116 He recalled that, per the updated Project Plan, GOSUD will continue routine operations on SSS and SST but also will work to set up the following facilities:

- provide a distribution for Carbon data and related parameters
- provide a repository for FerryBox multi-parameters data
- provide a repository for shipborne (vessel-mounted) ADCP data from GOSHIP

117 He reminded the Committee that GOSUD is a best effort project and, for this reason, it is difficult to conduct. Finally he recalled that GOSUD is seeking one or two chair persons to take over from the present ones not later than June 2018.

118 The SeaDataNet representative, Dr Michèle Fichaut, informed the Committee that all French GOSUD data have been ingested into the SeaDataNet system and can be retrieved from that system and discovered from the IODE Ocean Data portal which exposes the contents of SeaDataNet and other external catalogues.

119 **The Committee expressed** its appreciation with the work achieved and **welcomed** the proposed link between GOSUD and the Surface Ocean CO2 Atlas (SOCAT) project, with the European FerryBox initiative and with GO-SHIP.

3.4.6 International Coastal Atlas Network project (ICAN)

120 This agenda item was introduced by Ms Marcia Berman, Co-Chair of the IODE Steering Group for the ICAN project. She referred to **Document IOC/IODE-XXIV/3.4.6**. (***International Coastal Atlas Network***).

121 The Co-Chair of the SG-ICAN introduced the overall objective of the project which is “to encourage and facilitate the development of an integrated network of digital atlases of the global coast based on the principle of distributed, high-quality data and information”. Coastal Web Atlases (CWAs) are being developed at local, regional, national and international scales all over the globe. Through the sharing of knowledge and experience, the ICAN has seen a great expansion of this activity of the last decade. ICAN provides solutions and support to

atlas developers and the user community to maximize data integrity, product relevance, and added value for the coastal community of practice.

122 Ms. Berman reported that during the inter-sessional period the following activities were implemented:

(i) continued expansion of the website transition (http://ican.iode.org);

(ii) expert travel and outreach: two ICAN Newsletters were published; ICAN has built strong synergies with the Ocean Teachers Academy by providing technical expertise and training at OTA sponsored events such as SPINCAM, ODINAFRICA and the Caribbean LME projects. ICAN members participated in 6 other training programs around the globe. ICAN members presented 10 scientific and technical papers and talks at 10 international meetings around the globe;

(iii) the ICAN-7 workshop on "Supporting Ecosystem Based Management was held in April, 2015 in Cape Town, South Africa. This event was held in conjunction with the OTA and the international CoastGIS conference.

(iv) the network of global coastal web atlases has expanded to 71;

(v) two ICAN SG members published a practical guide on best practices for engaging your CWA user community. This guide was distributed to committee session participants in their registration packet [Kopke K. & Dwyer N. (Eds.).(2017) ICAN - best practice guide to engage your CWA user community. Paris. Intergovernmental Oceanographic Commission of UNESCO (IOC Manuals and Guides 75) 28 pp. (English) (IOC/2016/MG/75)];(OceanDocs: http://hdl.handle.net/1834/9579)

(vi) the technical team created access to cookbooks, archived information, and technical forum discussions globally through the use of the GitHub;

(vii) the ICAN SG has begun planning discussions and coordination with INVEMAR to host the ICAN8 Workshop in 2017 in Santa Marta, Colombia; teaming once again with the Ocean Teacher Academy and the International CoastGIS Conference, with what promises to be another well attended event in direct support of the coastal web atlas community.

123 The delegate of Japan recommended for ICAN to link with other similar UN initiatives such as The United Nations initiative on Global Geospatial Information Management (UN-GGIM).

124 **The Committee welcomed** the work achieved by ICAN and the considerable growth of the ICAN network.

125 **The Committee strongly urged** relevant organizations and projects to join the ICAN project and community if appropriate, and to take part in ICAN activities and workshops.

3.4.7 International Quality Controlled Database project (IQuOD)

126 This agenda item was introduced by Dr Catia Domingues, Co-Chair of the IODE Steering Group for IQuOD (http://www.iquod.org) . She referred to **Document IOC/IODE-XXIV/3.4.7**.(***IODE International Quality-controlled Ocean Database***).

127 Dr Domingues informed the Committee that, through coordination of resources and expertise into a single best practice international community effort, the IQuOD project aims to produce, freely distribute and curate the highest quality, most complete and consistent global ocean subsurface temperature profile repository for Earth system, climate and ocean studies, with (intelligent) metadata and an uncertainty estimate for every observation.

128 Major activities during this inter-sessional period included: (i) development of a "first cut" intelligent metadata algorithm; (ii) development of "first cut" uncertainty estimates; (iii) implementation of exact duplicate checks; (iv) implementation of 49 community-based quality

control procedures on github; (v) selection of high quality regional datasets for auto-quality control benchmarking.

129 Dr Domingues noted that there was already close collaboration between IQuOD and three other IODE projects such as WOD, GTSPP and GODAR. As recommended by IODE (http://www.iode.org/index.php?option=com_content&view=article&id=461&Itemid=100199), some of these IODE project members are also part of the SG-IQUOD. She informed the Committee that IQuOD is also a SCOR working group (http://www.scor-int.org/SCOR_WGs_WG148.htm). However, she urged other potentially relevant IODE and partner projects to engage with IQuOD (e.g., Seadanet, OceanDataPractices, ODIP, JCOMM, etc).

130 **The Committee instructed** Dr Domingues to contact NODCs, ADUs and relevant IODE projects to invite collaboration with the IQUOD project, particularly in terms of:

(i) provision of automated quality control tests for coordinated benchmarking activities, with a focus on historical ocean temperature (salinity) profiles;
(ii) provision of high-quality reference regional temperature/salinity datasets (of known quality) that can be used for the above coordinated benchmark exercises;
(c) provision of historical ocean temperature and/or salinity profiles with full vertical resolution and metadata when available (paper or digital form) and which is not yet part of the WOD;
(d) expertise on quality control (automated and/or manual) in specific ocean regional for temperature/salinity profiles (eg, North Sea, Mediterranean Sea, Southern Ocean, etc);
(e) expertise on historical instrumentation used to collect ocean temperature and salinity profiles;
(f) knowledge and/or experience with machine learning techniques that could be applied to the quality control of hydrographic (temperature/salinity) profiles;
(g) in kind support (part-time/temporary) for scientific programming of automated quality control tests, from their native language into open-source Python; and
(h) feedback on how IQuOD could potentially contribute/benefit your NODC and IODE project related activities (synergies).

131 **The Committee instructed** Dr Domingues to discuss with Dr Claudia Delgado (IODE training coordinator) potential avenues for developing capacity building activities related to IQuOD activities.

132 **The Committee requested** NODCs, ADUs and IODE Secretariat to promote the visibility of the IQuOD project so as to maximize international endorsement, strategic collaborations and therefore (inter/national) funding avenues.

133 **The Committee welcomed** progress made by the IQuOD project during its first 2 years after establishment as an IODE project.

134 The IODE Co-Chair (Prof Yutaka Michida) suggested to consider closer collaboration between GTSPP, WOD, GODAR and IQuOD. In response to Prof Michida's request Dr Domingues clarified the existing cohesive working relationship as follows:

(i) GTSPP has provided a list of automated QC tests and QC expertise to IQuOD (i.e., GTSPP members are also participating in IQuOD to help on the task of enhancing automated QC tests).

(ii) WOD will continue to acquire the real-time subsurface temperature (and salinity) profiles with metadata from GTSPP and forward them to IQuOD. IQuOD will apply scientific QC tests to the temperature observations and return the QCed profiles with 'intelligent metadata, the so-called i-metadata, and uncertainties attached to each observation to GTSPP via WOD. Salinity observations when jointly available with temperature will be carried along but not quality-controlled by IQuOD due to limited resources.

(iii) GTSPP will load the IQuOD QCed data retrieved from WOD, with i-metadata and uncertain-ties, onto the GTSPP database and replace the real-time copy of the data, if any, and distribute them as the "Best Copy" whenever they are available.

(iv) In addition, if IQuOD receives profile data (and metadata) from third parties and which are not yet available in WOD, IQuOD will inform GODAR for inclusion in WOD.

135 **The Committee welcomed** the existing and proposed activities in order to optimize collaboration between GTSPP, WOD, GODAR and IQuOD.

3.4.8 IODE OceanDataPortal

136 This agenda item was introduced by Mr Tobias Spears, Chair of the IODE Steering Group and Project Manager for the ODP project. He referred also to Dr Sergey Belov, ODP Technical Manager as co-author of the **Document IOC/IODE-XXIV/3.4.8**.(***IODE Ocean Data Portal).***

137 The IODE Ocean Data Portal activity focused primarily on support for existing node and data providers during this inter-sessional period. Technology and content upgrades were incorporated into the ODP global node and Sistema Nacional de Datos del Mar (SNDM) regional node. The ODINWESTPAC regional ODP node is currently active with initial data contributions currently accessible, and mobilization of data in support of the ODINAFRICA regional node continues. The ODINBLACKSEA regional ODP node is in the process of being re-established.

138 The ODP team has continued to participate in the brokering activity within Ocean Data Interoperability Platform (ODIP), and collaborate with EMODNet Physics, SeaDataNet, and WMO in order facilitate the exchange of data with other systems and to contribute to the development and promotion of standards and best practices.

139 The ongoing challenges with increasing the network of ODP node and data providers resulted in a review of the state of the ODP and a follow-up discussion with the IODE Officers in January 2016. As a result of this review, the team has been working with EMODNet Physics as an initial demonstration for how the ODP activity can be realigned to better promote and leverage other established systems and programs, while supporting IODE stakeholders in improving discovery and access to their marine data.

140 The Committee was also reminded that the agreement between the Russian Federation's ROSHYDROMET and IOC regarding the "Partnership Centre for the IODE Ocean Data Portal" would expire (5 years after its signature) on 27 March 2018. In accordance with the MoU "*UNESCO/IOC and Roshydromet will review the contribution of the Partnership Centre for the IODE ODP to the objectives and activities of the IODE prior to the expiry of this Memorandum of Understanding. The results of the review will be submitted for consideration to the IODE Committee that oversees the activities of the Partnership Centre for the IODE ODP. The IODE Committee may, as it deems necessary, recommend the renewal or extension of this Memorandum of Understanding to the two participants*". Taking into account that the MoU would expire during the next intersessional period (2017-2019) the Committee was requested to propose modalities (terms of reference) for the review of the contribution of the Partnership Centre to the IODE ODP.

141 Mr Spears requested that the Committee offer suggestions for performance metrics, but none were offered.

142 **The Committee invited** Mr Mathieu Ouellet (Canada), Mr Tobias Spears (Chair SG-ODP), and Mr Patrick Gorringe (EuroGOOS), and Mr Ariel Troisi (Argentina) to prepare modalities for the review of the contribution of the Partnership Centre for the IODE ODP for approval by the IODE Co-Chairs. [deadline: September 2017]

143 **The Committee instructed** the Secretariat and **requested** Roshydromet to organize

the review and publish its report by the 25th Session of the IODE Committee (2019).

3.4.9 IODE OceanDataPractices

144 This agenda item was introduced by Ms Pauline Simpson, Project Manager of the ODPr project. She referred to **Document IOC/IODE-XXIV/3.4.9**. (***OceanDataPractices***)

145 Ms Simpson explained that Organizations and expert communities in marine data and information management have been generating and publishing best practices, but, there was always a lack of an exclusively best practices repository. OceanDataPractices (ODPr) is created to fill this niche and provide a platform for organizations to work on common standards and avoid duplication. ODPr will allow individual researchers from all around the world to find and follow practices approved by specialized expert bodies and organizations.

146 The successful implementation of the OceanDataPractices repository is a contribution to the wider remit of the ODSBP Project. A Policy Document was submitted by the ODPr project team to the parent project in 2015 for approval and implementation, but no action has been taken. The ODPr project team continue to make additions to the repository and intend in 2017 to synchronize the functionality already implemented in OceanDocs (same DSpace software). The limited time available from the IODE ICT support means that it is necessary to look for contractor help to achieve this. An online usability survey will be conducted after this ODPr work has been completed for feedback and also as an advocacy tool.

147 Ms Simpson also reported that ODIP has approached ODPr about using ODPr as the official repository for ODIP project documents.

148 **The Committee decided** to actively promote OceanDataPractices at the widest level possible and to encourage organizations and expert bodies to deposit best practice documents in OceanDataPractices.

149 **The Committee noted** the lack of sufficient IT support for the OceanDataPractices project at the IOC Project Office for IODE and **called on Member States** to provide IT "time secondment" by IODE partners (NODCs, ADUs, …) as an in-kind contribution to IODE as a possible way to solve this problem.

3.4.10 IODE OceanDocs

150 This agenda item was introduced by Ms Pauline Simpson, Project Manager of the OceanDocs project. She referred to Ms Jennifer Walton and Ms Arame Keita, incoming Co-Chairs of the SG-OceanDocs as co-author of **Document IOC/IODE-XXIV/3.4.10**.***(OceanDocs***).

151 Ms Simpson recalled that OceanDocs was a digital repository of ocean research outputs particularly publications. In her presentation she provided a positive picture of the growth of OceanDocs, underlining this with such statistics as a 33% increase in deposits during 2015-2016 (1800 deposits). Activities in the past two years reflect a supportive Steering Group and a dynamic management strategy alongside efficient responses to depositors' submissions and queries. A new OceanDocs brochure and poster have supported an intensive advocacy campaign that has resulted in a large OceanDocs Community listserv and new deposits worldwide, particularly welcoming is Poland, Vietnam and Philippines, Iran and Brazil. She made a call for the badly needed increase in the IT support for the OceanDocs DSpace repository software. With the help of the IODE Community in also using and depositing and supporting the expansion of OceanDocs we look forward to OceanDocs making a more significant contribution to open access to research outputs in the marine sciences.

152 She also highlighted that the system allocates a persistent identifier (PID) from the handle.net system, that makes it possible to cite the publication in a document with a unique

identifier.

153 She further introduced the work plan for the next inter-sessional period.

154 **The Committee urged** Member States to encourage the deposit of works in OceanDocs or implementation of their own national/institutional e-repository with OceanDocs assistance.

155 **The Committee urged** Member States to join the OceanDocs Community to advocate deposit and use of OceanDocs.

156 **The Committee noted** the lack of sufficient IT support for OceanDocs project at the IOC Project Office for IODE and **decided** to consider IT "time secondment" by IODE partners (NODCs, ADUs, …) as an in-kind contribution to IODE.

157 Canada raised the instance of the same document being deposited into separate distinct repositories. It is possible to place the document into more than one collection in the same repository. However apart from importing records between separate repositories it is not possible. OceanDocs is a general ocean publications repository but ODPr is a focused repository for the deposit and discovery of best practices only.

3.4.11 IODE OceanExpert

158 This agenda item was introduced by Ms Linda Pikula, Chair of the IODE Steering Group for the OceanExpert project. She referred to Mr Aditya Naik-Kakodkar, Project Manager the as co-author of **Document IOC/IODE-XXIV/3.4.11**.(***OceanExpert***).

159 Ms Pikula recalled that the OceanExpert project fulfils the mandate given by the **United Nations Convention on the Law of the Sea** (UNCLOS ANNEX VIII, Art. 2) to the UNESCO/IOC, which requires development and maintenance of a list of experts in the field of marine science. Through its evolution over the past 20 years, OceanExpert is now the main UNESCO/IOC approved source of knowledge on individuals and institutions whose activities relate to marine/coastal research, commerce, academics and social science. The project has assumed the role of a community or a system providing a platform for researchers to collaborate by finding and linking to experts with a particular expertise and from a particular region. As of November 2016, OceanExpert contains information on 11,633 experts, 4130 institutions, 1,656 events and 17,111 documents.

160 Furthermore, the **IOC country profiles** plugin plans to build a profile for each UNESCO/IOC member state. Especially, generating a statistic on the participation of member states in activities organized by UNESCO/IOC. Availability of such "at-a-glance" information will help member states in their annual reporting at the IOC assembly or showcase their achievements at other fora.

161 The **Large Marine Ecosystem (LME)** projects plugin plans to create a database of projects related to LME and contribute in better management of this information at a centralized location. It will help stakeholders find relevant project related information using advanced search mechanism built into OceanExpert. Future plans include developing of functionality, which will allow users to compare outputs of various LME projects.

162 The project is fast becoming a platform of choice for IOC/IODE projects to build bespoke value added services. A good example of this is the creation of the planned **OceanTeacher Global Academy (OTGA)** training application registration plugin or the creation of the single sign-on token designed for **Ocean Biogeographic Systems (OBIS)** and the new version of **UNESCO/IOC website** to allow members use their OceanExpert login credentials to access both the products. This is part of a larger plan to use OceanExpert credentials as a single sign-on system for all the products under the UNESCO/IOC ecosystem improving the user experience.

163 OceanExpert is also collaborating with UNESCO/IOC's sister organizations such

as **World Meteorological Organization (WMO)** by proving country based individual and institution profile data (under the auspices of JCOMM) to the WMO's Country Profile Database (CPDB) system.

164 In 2016, a complete redesigning of the OceanExpert application was taken up to improve its functionality and user experience. The completion of the core functionality is in its final stages. A complete switchover to the new system will happen in April 2017. Considering the increased usage as well as the rise in the interest of both IOC programmes/projects and the external organizations, the major requirement of the project is the human resources needed for the constant improvement and maintenance of the underlying application. It is apparent that the project will remain a vital resource for the global marine science community and hence it is very important that the committee considers allocating required resources to the project.

165 **The Committee urged** Member States to promote OceanExpert nationally and regionally and **encouraged** ocean scientists and other professionals to create and maintain their profile in OceanExpert.

3.4.12 IODE OceanKnowledge Platform Pilot Project

166 This agenda item was introduced by Ms Pauline Simpson, Chair of the IODE Steering Group for the OceanKnowledge Platform project. She referred to Mr Aditya Naik-Kakodkar, Project Manager as co-author of **Document IOC/IODE-XXIV/3.4.12**.(***Ocean Knowledge Platform Pilot Project***).

167 Ms Simpson recalled that the grand vision for OceanKnowledge was to build a discovery platform across all marine-related websites and databases but for the demonstrator pilot project it was decided to build a discovery platform that would search across only the International Oceanographic Data and Information Exchange (IODE) data and information products These products range from information on individuals and documents to physico-chemical and biological data. OceanKnowledge is planned to map linkages between these diverse sets of data and information. The resulting scalable system will provide a simplified and structured single point discovery interface not only to IODE products but eventually to products from partner organizations and more.

168 Whilst the OceanKnowledge description sounds simplistic, the underlying semantic technology, standards, interoperability, linked data and information exchange between content providers and their microdata layers requires innovative high tech solutions to pull together the information model.

169 A Project Plan has been produced that defines use cases and provides a start point system diagram. A rewrite of the primary content provider OceanExpert has taken all of 2016, but once this building block is back in place, work on developing the OceanKnowledge Platform can proceed. Interest has been shown in the project from IOC and LME:Learn (Large Marine Ecosystems Learn) Programmes. It is obvious the project needs resource investment (additional ICT developers) to take this forward to at least a prototype stage during 2017 to what eventually will be a major technological contribution to the Global Information Portal. The work on the OceanKnowledge Project is expected to contribute to the IOC Audit recommendation for a 'universal information system and ocean data portal'

170 **The Committee noted** the lack of sufficient IT support for the OceanKnowledge project at the IOC Project Office for IODE and **decided** to consider IT "time secondment" by IODE partners (NODCs, ADUs, …) as an in-kind contribution to IODE. Volunteers should have proven skills in semantic web or big data technologies and could submit their letter of interest to the Project Manager (Mr Aditya Naik-Kakodkar) stating their competencies and hands-on experience in the field. The OceanKnowledge steering group will invite experts to join the project based on its operational requirements.

3.4.13 IODE OpenScienceDirectory

171 This agenda item was introduced by Ms Linda Pikula, Chair GE-MIM. Ms Pikula informed the Committee that the OpenScienceDirectory activity is not a "standard" project but is rather a service offered by a Member State and commercial company to the ocean research community since 2008. The Open Science Directory (http://www.opensciencedirectory.net), which utilizes EBSCO's A-to-Z® locator product to provide access to useful scientific information needed in many of the world's developing nations, has originally been developed by EBSCO and Hasselt University Library based upon a request by marine information management experts collaborating within the framework of the IOC's IODE programme.

172 **The Committee noted** the usefulness of the initiative and **encouraged** its continuation.

3.4.14 IODE Quality Management Framework project (QMF)

173 This agenda was introduced by Mr Greg Reed (Chair SG-QMF), referring to **Document IOC/IODE-XXIV/3.4.14**. (***IODE Quality Management Framework***).

174 He recalled the objectives of the project as: (i) provide the overall strategy, advice and guidance to NODCs to establish organizational quality management systems for the delivery of oceanographic and related data, products and services; (ii) initiate and review existing standards and Manuals and Guides with respect to the inclusion of quality management procedures and practices; (iii) apply the necessary capacity development activities to ensure accreditation of NODCs according to agreed criteria in order to bring all NODCs to a minimum agreed level.

175 Mr Reed informed the Committee that during the inter-sessional period the focus for IODE-QMF was on educating the community and encouraging NODCs to apply for accreditation. A successful training course was held from 30 November to 3 December 2015 on Quality Management System Essentials for National Oceanographic Data Centres, which was attended by 10 representatives of NODCs and ADUs. The training course provided an introduction to the development, implementation and management of a Quality Management System and the IODE accreditation requirements for NODCs. The aims and objectives of the course were: (i) To introduce the IODE Quality Management Framework; (ii) To explain the importance of quality for oceanographic data; (iii) To introduce the ISO 9000 series of standards; (iv) To provide a description of a Quality Management System; (v) To enable a clear understanding of the requirements of a quality manual; and (vi) To describe accreditation of National Oceanographic Data Centres. Most course participants indicated that their institution will implement a QMS and apply for IODE accreditation.

176 The accreditation process is currently open to all NODCs. As the number of ADUs is growing (currently 22) and ADUs are contributing data to NODCs and the OBIS portal as data providers, it is important that those ADUs that meet the IODE accreditation requirements are recognized. It is recommended that ADUs can apply for accreditation and those ADUs that meet the IODE accreditation requirements will be awarded the status of "Accredited IODE Associate Data Unit".

177 Mr Reed noted that there had been slow uptake of the Quality Management Framework from the IODE community and all NODCs are encouraged to develop a Quality Management System for the Centres and to apply for IODE accreditation.

178 He informed the Committee that during the inter-sessional period two applications for

accreditation were received and were positively evaluated: the French National Oceanographic Data Centre (SISMER) and the Iranian National Center for Ocean Data (INCOD). Accordingly, SISMER and INCOD have achieved the status of accredited IODE National Oceanographic Data Centre. Certificates were issued to SISMER and INCOD. This now brought the total number of accredited NODCs to four.

179 Mr Reed announced that the OceanTeacher Global Academy will conduct a training workshop on the IODE Quality Management Framework to provide an introduction for NODCs and ADUs involved in the development, implementation and management of a Quality Management System to be held 11-14 September 2017 at the IODE Project Office, Oostende, Belgium.

180 The delegate of France, Mr Loïc Petit de la Villéon thanked the reviewers and the IODE committee for the accreditation of the French NODC (Sismer). He highlighted that going through the accreditation process had a positive internal effect in identifying weaknesses in the data management procedures and in the documentation. He hoped that the accreditation of his data centre would lead to better recognition of the marine data management activities at the national level. He also informed the Committee that it took one man/month to fill up the requested document. Finally, he encouraged all the NODCs to apply for the IODE accreditation and informed the committee that France will be very pleased to share experience and report.

181 The representative of Republic of Korea informed the Committee that they also started a QMF project in 2016 and have obtained ISO 9001 certification. He noted that ISO 9001:2015 is the current version and the IODE QMF should update its documentation which still uses ISO 9001:2008as a reference.

182 **The Committee welcomed** the progress of the QMF project while **noting** that more applications would be welcomed.

183 **The Committee called** on its members to nominate experts with experience in implementing quality management systems for management of oceanographic data to the SG-QMF for the next intersessional period.

184 **The Committee encouraged** all NODCs and ADUs to apply for accreditation.

185 **The Committee decided** to revise the terms of reference of the IODE QMF project (Recommendation IODE-XXII.18) to allow ADUs to be accredited and **adopted** Decision IODE-XXIV.1.

186 **The Committee** invited accredited NODCs to share experience on the accreditation process with other NODCs and ADUs. In this regard China's NMDIS offered its assistance to NODCs and ADUs in the WESTPAC region, while France's SISMER offered to share their expertise as well.

187 **The Committee** decided that the IODE QMF should be updated to the 2015 ISO:9001 version.

188 **The Committee** decided that AIUs should also be taken into account and invited the SG-QMF to study this possibility.

3.5 PROGRESS REPORTS OF JOINT ACTIVITIES WITH OTHER PARTNERS

189 This agenda item was introduced by Prof Yutaka Michida. He informed the Committee that IODE, in addition to implementing its own projects and other activities also collaborates closely with other bodies such as the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM) as well as with an increasing number of IOC programmes, thereby responding to the new IOC structure that focuses on 6 functions documented in the IOC Medium-Term Strategy (2014-2021).

3.5.1 JCOMM

190 This agenda item was introduced by Dr Sergey Belov, Chair of the JCOMM/IODE ETDMP. He informed the Committee on the most recent developments in JCOMM related to oceanographic data management and the role of, or opportunities for IODE.

191 He recalled that the primary objective of the JCOMM Data Management Coordination Group (DMCG) is to build an integrated global marine meteorological and oceanographic data infrastructure driven by common data management practices and procedures to support the JCOMM Strategy in close collaboration between the IOC International Oceanographic Data and Information Exchange (IODE) and WMO Information System (WIS).

192 The Marine Climate Data System (MCDS) which was established at JCOMM-4 to address the WMO-IOC requirements for climate monitoring, forecasting and services has made significant progress. Candidates for Centres for Marine-meteorological and Oceanographic Climatological Data (CMOCs), Global Data Assembly Centres (GDACs) and Data Acquisition Centres (DACs) centres have been identified under the MCDS structure. Informal and formal discussions has taken place with number of candidate centres. One CMOC centre in China hosted by National Marine Data and Information Service, State Oceanic Administration(NMDIS/SAC) has been established by WMO and IOC. Other possible CMOC centres include for example the International Comprehensive Ocean-Atmosphere Data Set (ICOADS), World Ocean Database (WOD), and are under consideration.

193 Dr Belov noted that the Terms of Reference(ToR) defined for GDACs under the MCDS structure and the IODE structures are very similar except for one clause which is related to the connection of these centres to the WMO Information System (WIS) and the IODE Ocean Data Portal (ODP) (See Figure 1). At the 13th JCOMM Management meeting, it was agreed and advised to harmonize the ToR of the GDACs between the MCDS and the IODE by including the clause “connection to WIS/ODP” as an optional item which will provide flexibility for the GDACs to be part of MCDS and IODE without constraints. It therefore is proposed to have joint IODE-JCOMM GDACs with unique ToRs. Reference is made to agenda item 3.3 in this regard.

194 Trial GDACs for drifting buoys (France/Canada) were established by JCOMM-4 (2012). [At the time of writing this report] Canada has unofficially confirmed the commitment to become a GDAC for drifting buoys. Progress has also been made in developing regulatory and guidance material under the WMO for the MCDS.

195 Mr Belov noted that JCOMM DMCG and IODE are working towards a collaborative effort on data management, to also include perspective of the JCOMM Observations Programme Area with regard to data management integration, including for the real-time flow, using technologies such as OPeNDAP and ERDDAP. Thus, key principles of the JCOMM Data Management Strategy will align with the IOC Strategic Plan for Oceanographic Data and Information Exchange which is under review, and key elements of the JCOMM DM Strategy are proposed to be reflected in the IOC strategic plan. JCOMM DM Strategy will be presented to the JCOMM V for approval. The JCOMM Management Committee at its 13th Session (Geneva, Jan. 2017), while noting that the IODE was dismantling its Groups of Experts and forming projects to replace them, agreed that JCOMM-5 should be invited to re-instate the ETDMP under JCOMM Working Structure, and to add in its Terms of Reference requirements to address Table Driven Codes. IODE will be invited to endorse the new ETDMP, once and if established by JCOMM-5 as a joint Team with the IODE.

196 **The Committee welcomed** the close collaboration between IODE and JCOMM through the JCOMM/IODE ETDMP.

197 It was noted further that collaboration between ETDMP and the Task Team of DMPA on Table Driven Code Forms is important in order to better coordinate and align the real time data standardization for the many JCOMM data streams.

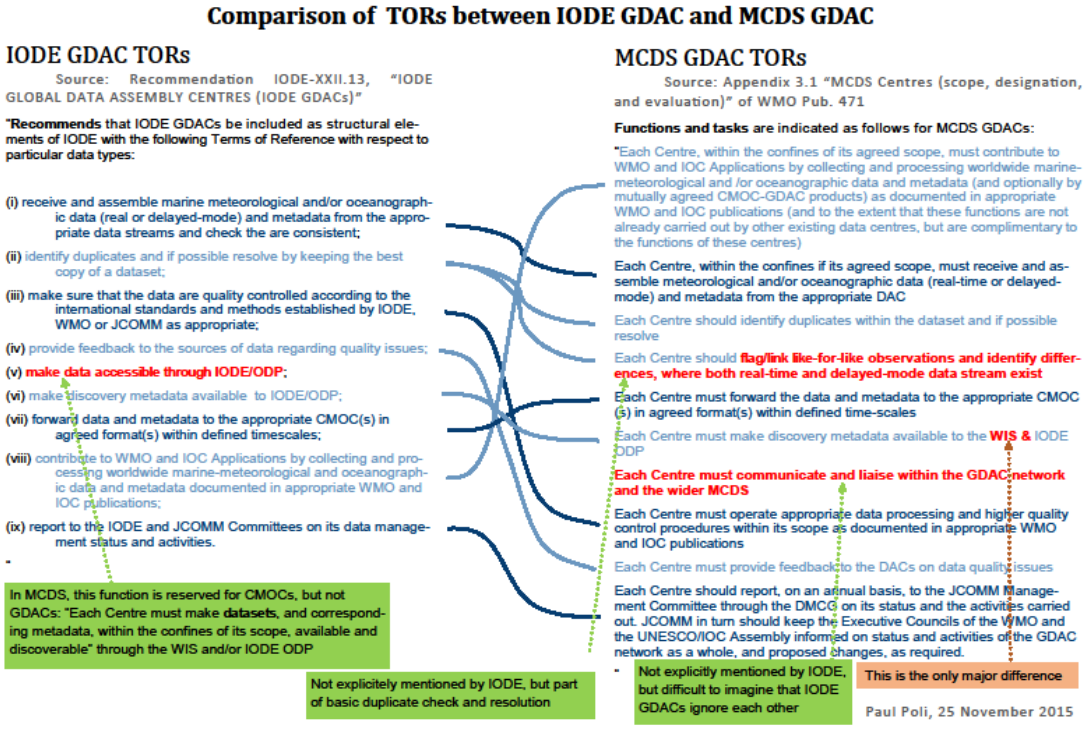

Figure 1: Comparison between IODE GDAC and MCDS GDAC

198 The JCOMM co-president, Dr Nadia Pinardi, clarified that the Cross cutting Task Team for Integrated Marine meteorology and Oceanography Services within WIS (TT-MOWIS) defines standards for all IODE and JCOMM centres to be connected to WIS through standard protocols and transparent procedures which are not existing at the moment.

199 **The Committee noted** that the Terms of Reference of the IODE GDAC with the MCDS GDAC (written in WMO-471 – to be published) are different and **suggested** to amend the IODE ToR (v) and (vi) – see Figure 1- into: "Each GDAC be interoperable with the WIS and/or IODE ODP".

200 The JCOMM Co-president reminded that the key principle of becoming a GDAC is to be compliant and transparent with international standards and best practices, allowing global data systems to improve their capacity and outreach.

201 The Committee took note that ODP is compatible with WIS and will be contributing to WIS, however, there will also be direct data stream connections from NODCs to WIS following specific WIS protocols.

3.5.1.1 Ocean Data Standards and Best Practices (JCOMM/IODE)

202 This agenda item was introduced by Prof Yutaka Michida, Co-Chair of SG-ODSBP, referring to **Document IOC/IODE-XXIV/3.5.1.1**.(***Ocean Data Standards and Best Practices).***

203 He reported on the activities of the ODSBP project during the last inter-sessional period. At the IODE Officers' meeting in June 2016, big delays of the reviewing processes for the proposals submitted over the last 1.5 years were recognized and acceleration of the processes was strongly recommended.

204 The internal review for all of 6 proposals, CDI and its XML encoding as metadata model, CSR and its XML encoding as cruise reporting, NetCDF as data transport model, submitted by SeaDataNet, and vocabularies jointly submitted by SeaDataNet and ODIP project, was completed by the end of October 2016.

205 Four of 6 proposals are now in the stage of 'Expert Review', while the remaining two for NetCDF and vocabularies will follow shortly.

206 He noted that it took more time than expected to seek appropriate experts for the expert reviewing. In this regard Prof Michida called for Member State representatives to nominate experts to join the project to review proposals.

207 Dr Fichaut, representing SeaDataNet, called for more transparency in the process as it was difficult to find out what was the status of an application. Prof Michida informed that all SeaDataNet proposals have been internally reviewed and are in expert review. He asked the Secretariat to update the web site accordingly.

208 The delegate of the United Kingdom noted that in the WDS there is an International Virtual Observatory Alliance. They also have an agreement on standards and possibly we could learn from them. They could be approached for advice.

209 **The Committee acknowledged** the challenges to find volunteer experts to review the proposed data standards and best practices and **requested** the IOC Member States to nominate experts and provide or update the information including expertise of their experts in the OceanExpert database.

3.5.2 IOC

3.5.2.1 GOOS

210 This agenda item was introduced by Mr Patrick Gorringe (EuroGOOS). He recalled that data management (assembly, synthesis, distribution, archiving) is a core output considered in the Framework for Ocean Observing (doi:10.5270/OceanObs09-FOO, 2012), which is a guiding document for the work of the Global Ocean Observing System (GOOS). Therefore IODE has an important role to play in the full functioning of GOOS, and this is recognized with its ex officio seat on the GOOS Steering Committee.

211 The data management activities and interests of GOOS are most closely associated with the observations coordination activity, which has two major pillars: the JCOMM Observations Coordination Group (OCG), and the GOOS Regional Alliances.

212 JCOMM OCG unites the global observing networks: the Data Buoy Cooperation Panel (surface drifters and moorings), the Ship Observations Team (observations from commercial vessels), the GLOSS tide gauge network, Argo (profiling floats), GO-SHIP (repeat basin-scale hydrography from research vessels), and IOCCP (other ocean carbon measurements). It has also started collaboration with a global subsurface glider network OceanGliders and HF coastal radar sites. The main interest of the OCG in data management is to promote network-based best practices and standards in data management, including best practices in quality control, real-time data streams, archiving, synthesis, and a focus on interoperability of access to data streams through the ERDDAP protocol (see also item 3.5.1 JCOMM). The proposed biogeochemistry GDAC in Bergen, Norway, grew out of data synthesis activities of the IOCCP and the oceanographic community. The OCG also oversees the work plan of the JCOMM In Situ Observing Programme Support Centre (JCOMMOPS, Brest, France), which amongst other functions, serves as a metadata and data flow tracking centre, in support of the operators of the observing networks. Some of these network-based data centres are outside of traditional NODCs, emphasizing the importance of IODE engagement with ADUs. The link between IODE and the JCOMM Data Management Programme Area must be transparent and strong for GOOS's Framework for Ocean Observing to function.

213 Many of the GOOS Regional Alliances also operate their own data centres at the regional, national, or sub-regional level. Thus far, the collective effort of the GRAs in data management has been focused on the metadata, and being able to show all of the in-water assets of the GRAs on a common map. This effort has been led by EuroGOOS on the basis of the EMODNET Physics portal. Strong data management efforts in the US IOOS, in Europe with EuroGOOS and others, and in the Australian IMOS are already collaborating, and could form the basis of further GRA projects in mutual aid around data management.

214 As biological and ecological observations under GOOS develop, a strong cooperation has already been developed with OBIS. But new observing networks incorporated into GOOS will bring their own data management systems and challenges. And overall, network-focused data management systems should be better incorporated into an approach around the delivery of data on Essential Ocean Variables (EOVs), where IODE could play a reinforced role.

215 GOOS is developing a 5-10 year strategy that recognizes the importance of strong interfaces with the data management community in order to deliver on the full promise of GOOS, and get observations from observing networks to their primary and eventually their final users, in the area of climate, operational ocean services, and ocean health. A draft strategy will be circulated in mid-2017 for input from the ocean observing community, including IODE.

216 The International Council for Science (ICSU), one of GOOS's sponsors, is proposing a review of GOOS in late 2017 - early 2018. The scope of this review will be decided by all of the sponsors of GOOS (IOC/UNESCO, WMO, UNEP, and ICSU), and arguably should include the intersection of observing with data management systems, and so therefore with IODE and other activities. GOOS therefore anticipates asking for IODE's cooperation in this review.

217 Other more specific areas of cooperation identified could include observing-focused capacity development done in cooperation with OTGA, or auditing of EOV data streams, amongst other activities.

218 The Committee considered options for the best way to provide input, but one challenge will be the fast approaching deadline for providing feedback on the GOOS Strategy.

219 Australia offered that Mr Tim Moltmann (Director of Australia's Integrated Marine Observing System (IMOS), Chair of the Global Ocean Observing System Regional Alliance Forum, and an ex officio member of the Global Ocean Observing System Steering Committee), would be a very good resource for this process as well.

220 **The Committee welcomed** the statement made by GOOS on the importance of data management as an essential component of the framework for ocean observing and the role of IODE.

221 **The Committee established** an inter-sessional working group on cooperation with GOOS, which will assist GOOS with (i) input to the GOOS 5-10 year strategy (due by mid-2017); and (ii) participating in the review of GOOS to be conducted by ICSU and the other GOOS co-sponsors (IOC, WMO and UNEP), late 2017. The group will have the following membership: Roger Proctor (Chair), Eduardo Klein, Francisco Hernandez, Alessandra Giorgetti.

3.5.2.1.1 GEO BON/ MBON

222 This agenda was introduced by Mr Ward Appeltans. He reported on the objectives of GEO BON MBON and the recent collaboration agreement between GEO BON MBON, GOOS BioEco and OBIS.

223 The Marine Biodiversity Observation Network of the Group on Earth Observations Biodiversity Observation Network (GEO BON MBON) is a thematic BON that evolved from

GEO BON's Working Group on "Marine Ecosystem Change" and is envisioned as the key biodiversity pillar of GEO and GEO BON for the marine realm. The MBON aims to help coordinate individual monitoring programs and existing networks focused on local, regional and thematic aspects of marine biology and biodiversity and facilitate the sharing of data, experiences, and protocols to understand species and the status and trends of ecosystems and their services.

224 On 15 December 2016, GEOBON MBON signed a collaboration agreement with GOOS BioEco and OBIS to join efforts towards a sustained, coordinated global ocean system of marine biological and ecosystem observations to support management decisions and address relevant science and societal needs. Both GEO BON MBON and GOOS BioEco agreed that OBIS will play a key and central role in fostering wider data sharing, data curation and aggregation in order to streamline the feeding of integrated and quality controlled datasets into models and forecasts.

225 **The Committee welcomed** the collaboration agreement between GEOBON MBON, GOOS BioEco and OBIS.

3.5.2.2 MPR (Marine Policy and Regions)

226 This agenda item was introduced by Mr Julian Barbière. He noted the various areas related to marine policy and regions where IODE and MPR worked together both at the global and regional level. In this regard he referred to BBNJ (OBIS), ICAM and MSP (through ICAN and CMA2), and LME:Learn (OTGA). He then provided more detailed information on a few of these activities.

3.5.2.2.1 SPINCAM

227 This agenda item was introduced by Mr Julian Barbière. He referred to **Document IOC/IODE-XXIV/3.5.2.2.1** (***SPINCAM-3***).

228 Mr Barbière explained that SPINCAM (Southeast Pacific data and information network in support to integrated coastal area management) has supported the current national decision-making processes, by identifying ecological and socio-economic baselines and trends on the use of coastal areas and coastal resources, hence informing the definition of future strategies to face regional and global changes.

229 Within a global perspective, SPINCAM has provided all the partners involved with an excellent opportunity to contribute to the establishment of a reporting mechanism on the state of marine environment in the region and as a support to the countries to report on the Agenda 2030 sustainable development goals.

230 Furthermore, synergies and cooperation have been established with other projects of UNESCO, also funded by the Government of Flanders (Kingdom of Belgium) in the Latin American and Caribbean region, such as the Caribbean Marine Atlas II led by the IOC Project Office for IODE and IOCARIBE and BRESEP – Biosphere Reserves as a Tool for Coastal and Island Management in the Southeast Pacific Region led by the UNESCO Programme Man and Biosphere.

231 With respect to global projects and initiatives, SPINCAM II has increased the linkages with the GEF funded projects in the context of large marine ecosystems for both the Caribbean and in the Humboldt current, in addition to the linkages with the GEF Project on Transboundary Water Assessment Programme (TWAP) and the new initiative LME:Learn led by IOC/UNESCO.

232 SPINCAM partners have been active members of the International Coastal Atlas Network (IODE Project) and IBERMAR – Ibero-American Network of Integrated Coastal Area Management.

233 **The Committee welcomed** the past and planned cooperation between IODE and

SPINCAM through its NODCs, marine information management experts and OBIS nodes in the collaborating countries.

3.5.2.2.2 LME-Learn

234 This agenda item was introduced by Mr Julian Barbière, referring to **Document IOC/IODE-XXIV/3.5.2.2.2** (***LME:Learn***).

235 Mr Barbière recalled that the purpose of LME:LEARN is to improve global ecosystem-based governance of Large Marine Ecosystems and their coasts by generating knowledge, building capacity, harnessing public and private partners, and supporting south-to-south learning and north-to-north learning.

236 The project aims to meet this through identifying the priority issues affecting governance of the LMEs, along with their associated coastal zones, and marine protected areas, as well as their underlying root causes, and by integrating these in a global ecosystem-based governance framework founded on global coordination and cooperation.

237 IODE contributes to the implementation of the LME:learn project by leading data and information related activities organized under the Project's Working Group on Data and Information Management. The Working Group is chaired by the head of IODE Project Office, who also sits on the project Steering Committee.

238 Mr Barbière highlighted the valuable contribution from the OceanExpert project as an important foundation for the LME:Learn project.

239 JCOMM observed the value of connecting with the GOOS Regional Alliances. Mr Barbiere responded that certainly there is an ongoing dialog and data from the regional alliances have been supporting the project goals.

240 The Committee was informed that the LME:Learn D&IM WG meeting is scheduled to take place between 20-21 April 2017 in Oostende, Belgium.

241 **The Committee decided** to include financial support for travel support for a IODE representative to LME:learn Steering Committee meetings in 2018.

3.5.2.2.3 Sustainable Development Goals (SDG)

242 This agenda item was introduced by Mr Julian Barbière. He explained that in 2015, the United Nations adopted the Agenda 2030 and a set of Sustainable Development Goals (SDG), including a dedicated goal on the ocean, SDG #14 which calls to "converse and sustainably use the oceans, seas and marine resources for sustainable development". This constitutes an essential point of reference for IOC's engagement with its Member States as well as for its programmes at the global, regional and country levels.

243 He also referenced the presentation by the IOC Executive Secretary at the Scientific Conference that preceded IODE 24.

244 The IOC Executive Council at its 49th session decided that IOC should 'Provide normative support to countries to establish, implement, monitor and report on implementation of the Ocean SDG 14 and its related targets'. Through the establishment of an Inter-agency and Expert Group on SDG Indicators (IAEG-SDGs), composed of Member States and including regional and international agencies as observers, a formal SDG reporting process has now been established under the UN and a set of global indicators have been agreed to facilitate the follow-up and review of the 2030 Agenda and SDGs.

245 As part of this process, IOC has been identified as custodian agency for two SDG 14 targets and related indicators, these relate to ocean acidification (Target 14.3) and marine scientific research (Target 14.a). He also observed that ocean data will be relevant to many of the other goals, including for example, climate action, and also 'Blue Economy' contributions to economic development. Under this custodianship role, IOC will need to

further develop the indicator methodology and underlying data standards for these 2 targets, before the indicators are operational and routinely measured by Member States. Once this is done, the indicators will be cleared by the IAEG-SDGs and implemented through a periodic UN SDG reporting.

246 Once these SDG indicators are operational, IOC will have the responsibility at the global level to provide internationally comparable data in the different statistical domains, calculate global and regional aggregates, and provide data and accompanying metadata to UN Statistical Department.

247 At the national level, national statistical systems or a designated national coordination body will have the task to collect data according to agreed standards and provide these data and metadata for global reporting to the IOC.

248 Mr Ariel Troisi then briefly reported on the outcome of the sessional working group on IODE's response to SDGs. He reported that the SWG had identified the following items for discussion: (i) mapping of essential variables to SDG requirements; (ii) identification of global/regional/national sources of required variables; (iii) methodologies on how to use the data to construct the indicators; and (iv) guidelines to assist NODCs and ADUs coordinate with their respective national statistics agencies.

249 **The Committee called** on National Oceanographic Data Centres and Associate Data Units as contributors to a possible mechanism for reporting on IOC led SDG indicators, either through National Statistical Offices or directly.

250 **The Committee** requested its Co-Chair (Ms Chandler) as a focal point for SDG data issues.

251 **The Committee decided** to establish an inter-sessional working group to conduct the (i) mapping of essential variables to SDG requirements; (ii) identification of global/regional/national sources of required variables; (iii) methodologies on how to use the data to construct the indicators; and (iv) guidelines to assist NODCs and ADUs coordinate with their respective national statistics agencies; and to report its finding to the IODE officers/Co-Chairs by October 2017.

252 **The Committee requested** its Co-Chairs to ensure representation and inputs of IODE in the work of technical expert groups that will be established to finalize the indicator methodology and definition of data standards for IOC-led indicators.

253 **The Committee** instructed the SG-OTGA to consider capacity development activities in relation to data quality control, data access and dissemination relevant to SDG, if and when required.

3.5.2.3 Ocean Science

254 This agenda item was briefly introduced by Ms Cyndy Chandler, Co-Chair.

3.5.2.3.1 GOSR

255 This agenda item was introduced by Ms Cyndy Chandler, Co-Chair.

256 The Global Ocean Science Report (GOSR; http://www.unesco.org/new/en/natural-sciences/ioc-oceans/sections-and-programmes/ocean-sciences/global-ocean-science-report/), to be published in June 2017, is a first time ever effort undertaken by IOC and its Member States to identify and quantify the key elements of ocean science, including workforce, research expenditure, infrastructure and publications globally. GOSR will provide decision-makers with a tool to identify gaps and opportunities to advance international collaboration in ocean science and technology to meet societal needs and to promote the contribution of ocean research to address global challenges related to sustainable development.

257 Target 14.a calls for “increase scientific knowledge, develop research capacity and transfer marine technology, taking into account the IOC Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries, in particular small island developing States and least developed countries. Until present, no global mechanism for assessing and reporting on the level of human capacity, technology, investments, and needs of nations in ocean and coastal science, observations and services was available. GOSR will provide such reporting mechanism to inform progress towards the attainment of Target 14.a.

258 IODE has contributed to the production of the first issue of GOSR by coordinating input for the chapter on data and information management, based on a specialized survey focusing on data management and information exchange. This section of the report looks in particular into status and trends in national responses to requirements for handling oceanographic data and information, including infrastructures for data management, and access to and availability of data and information to policymakers and the general public.

259 Because the intended periodicity of GOSR is five years, a GOSR data portal will be needed as a mechanism to collect and deliver relevant information on a regular basis. The portal will be based on a document repository and provide access to raw data, metadata, and literature. It will also contain a function to alert the IOC Secretariat about mistaken or missing data and information by provision of quality control by Member States.

260 **The Committee welcomed** the pending publication of the first GOSR in June 2017 and **thanked** the authors who provided input to the Chapter on data and information management (Cyndy Chandler, Greg Reed, Linda Pikula, Lisa Raymond, Bob Keeley, Hernan Garcia, Ariel Troisi and Peter Pissierssens).

261 **The Committee decided** that planning specific actions and contributions by IODE at this time would be premature as the first edition of the GOSR would need to be discussed at the upcoming Session of the IOC Assembly in June and a decision on the future of the GOSR initiative (including timing) would be made there.

262 **The Committee instructed** the IODE Co-Chair, Ms Cyndy Chandler, to report back to the members of the Committee subsequent to the IOC Assembly and then to discuss with the GOSR leaders to discuss requirements from IODE. A possible description of work could include:

(i) identifying main elements and advise on a possible architecture of the GOSR data portal;
(ii) advise on practical modalities and standards to collect and update the data in the first issue of GOSR with reference to research capacity and infrastructure, research investments (research and observations), and research productivity and science impact, as well as relevant information on international organizations involved in ocean science, against the baseline provided by the first issue of GOSR;
(iii) advise on modalities of collaboration between IODE and the UNESCO Institute of Statistics (UIS);
(iv) assist in determining the scope of human and financial resources which may be needed to design and operationalize the GOSR data portal;
(v) provide any other relevant feedback on lessons learned in the context of IODE’s contribution to the first issue of GOSR.

3.5.2.3.2 HAEDAT

263 This agenda item was introduced by Mr Ward Appeltans.

264 The Harmful Algae Event Database (HAEDAT) is a database containing records of harmful algal events. The database is hosted at the IODE project office (http://haedat.iode.org/) and technically maintained by the OBIS secretariat. The information

is maintained by national designated focal points via an online input interface. HAEDAT currently holds information on 4,934 HAB events from 42 countries, between 1980 and 2017. Not less than 1,148 (23%) HAB events are entered or updated since 2015. Currently, HAEDAT focuses on improved coverage in Sub-Saharan Africa, South East Asia and South America.

265 The system will be redesigned by the OBIS secretariat so that the HAB event information is stored in the OBIS-ENV-DATA data standard and becomes compatible with OBIS. This will make it easier to integrate HAB species distribution from OBIS with actual harmful events from HAEDAT into a single HABMAP portal, with the aim to serve statistics and products for the Global HAB Status Report, which is planned to be released by the end of 2017.

266 **The Committee welcomed** the progress made with HAEDAT as an example of the contribution of IODE to other IOC programmes.

3.5.2.3.3 IOC Working Groups on IGMETS, TrendsPO, GO2NE

267 This agenda item was introduced by Mr Ward Appeltans.

268 The new IOC Ocean Sciences programme (adopted at the 49th session of the IOC Executive Council, June 2016) decided to continue the IOC international working group IGMETS (International working Group for Marine Ecological Marine Time Series) and established two new IOC Group of Experts: TrendsPO (Investigate Climate Change and Global Trends of Phytoplankton in the Ocean) and GO2NE (Global Ocean Oxygen NEtwork).

269 Their Terms of References include the development of a data management plan and data access plan in accordance with respectively, the "Guidelines for a Data Management Plan" (IOC Manuals and Guides No. 73) and the principles of clause 1 (for IOC programmes) of the IOC Data Exchange Policy. The IOC working groups are also requested to align with existing networks such as OBIS, to identify data sets available and suited for inclusion in OBIS and if appropriate be archived in IODE NODCs and/or the World Ocean Database (WODB).

270 It was noted that TrendsPO has a draft Data Policy as well as a data management plan.

271 **The Committee welcomed** the proposed cooperation between IGMETS and IODE.

3.5.3 European Union Projects

3.5.3.1 EMODNET

272 This agenda item was introduced by Mr Patrick Gorringe. He explained that the European Marine Observation and Data Network (EMODnet) is a long term marine data initiative from the European Commission Directorate-General for Maritime Affairs and Fisheries (DG MARE) underpinning its Marine Knowledge 2020 strategy.

273 The main purpose of EMODnet is to unlock fragmented and hidden marine data resources and to make these available to public and private users. EMODnet consists of more than 160 organisations assembling marine data, products and metadata to make these fragmented resources more available to users relying on quality-assured, standardised and harmonised marine data which are interoperable and free of restrictions on use. The EMODnet data infrastructure is developed through a stepwise approach in three major phases.

274 Currently EMODnet has finished the 2nd phase of development with eight sub-portals in operation that provide access to marine data from the following themes: bathymetry, geology, physics, chemistry, biology, seabed habitats, human activities and coastal mapping. EMODnet development is a dynamic process so new data, products and functionality are

added regularly while portals are continuously improved to make the service more fit for purpose and user friendly with the help of users and stakeholders.

275 Phase I (2009-2013) - developed a prototype (so called ur-EMODnet) with coverage of a limited selection of sea-basins, parameters and data products at low resolution;

276 Phase II (2013-2016) - move from a prototype to an operational service with full coverage of all European sea-basins, a wider selection of parameters and medium resolution data products;

277 Phase III (2016-2020) - works towards providing a seamless multi-resolution digital map of the entire seabed of European waters providing highest resolution possible in areas that have been surveyed, including topography, geology, habitats and ecosystems; accompanied by timely information on physical, chemical and biological state of the overlying water column as well as oceanographic forecasts.

278 **The Committee welcomed** and looked forward to close collaboration with EMODNET.

3.5.3.2 EOOS

279 This agenda item was introduced by Mr Patrick Gorringe. The European Ocean Observing System, EOOS, is a coordinating framework designed to align and integrate Europe's ocean observing capacity, promote a systematic and collaborative approach to collecting information on the state and variability of our seas, and underpin sustainable management of the marine environment and its resources.

280 EOOS aims to provide a framework within which European marine observations can be sustained and made available on a continuous basis for applications ranging from real-time services, through ocean health to climate services. EOOS will not take ownership or control of ocean observing in Europe. Rather, EOOS will provide a light and flexible coordinating framework to help manage and improve the existing observing effort, making it more efficient and effective at different geographical scales and for different users.

281 Specifically, EOOS will:

(i) Align and connect existing initiatives to ensure efficiency and value for money;
(ii) Identify gaps in the European observing capacity and foster initiatives to fill those gaps;
(iii) Promote observing capacities which can benefit multiple sectors including research, policy, management and industry; and
(iv) Ensure that European ocean observing is integrated into the global observation system(s) by providing a focal point for interaction with international programmes and partner initiatives outside of Europe.

282 An open stakeholder consultation ran for six weeks during December 2016 and January 2017, collecting views on an overarching ocean observing framework for Europe from a wide community of ocean data providers, infrastructure managers, technology developers, data users, and broader ocean observing stakeholders.

283 The results of the consultation will be released in Spring 2017 and the early results were presented at IODE-XXIV.

284 EuroGOOS and the European Marine Board are working together to promote and facilitate the establishment EOOS as an overarching ocean observing framework for Europe. In doing so, these networks are taking the initial steps to catalyze the development of EOOS on behalf of a wide community of ocean data providers, infrastructure managers, technology developers, data users and ocean observing stakeholders.

3.5.3.3 SEADATACLOUD

285 This agenda item was introduced by Dr Michèle Fichaut.

286 Ms Fichaut informed the committee that a new European project on SeaDataNet infrastructure has been launched under the H2020 Research and Innovation Action (RIA) funding Schema. The so called SeaDataCloud project started in November 2016 for a duration of 4 years and a total budget of 10 Million euros.

287 The new SeaDataCloud project aims at building upon and expanding the achievements of the SeaDataNet infrastructure, has the following main aims and objectives:

288 (i) **To enhance and innovate the SeaDataNet standards, products and services** offered to an expanded multi-disciplinary community by adopting a European cloud environment (EUDAT), in order to improve the performance of the data discovery and access. The range of services will be expanded by specifying, developing and deploying advanced e-services to facilitate individual and collaborative research (for example, customised services MySeaDataCloud and Virtual Research Environment will be provided). The implementation of SeaDataNet standards will be facilitated by offering to data centres a preconfigured and pre-built system including all necessary data management tools, easily deployable and ready to use with minimal setup.

289 (ii) **To promote the adoption of the protocols and standards** developed for interoperability to other key downstream initiatives in the field to expand the communities of data providers and users, mainly by having a scientific committee composed of lead customers, such as science community, EMODnet, Copernicus Marine Environmental Monitoring Service (CMEMS), and international scientific programmes such as SOCAT, ARGO, and others.

290 (iii) **To present a long-term sustainable arrangement for the integrated SeaDataNet infrastructure** and network of the key data centres in Europe for in situ and remote sensing data for marine research (including coastal research) and their resources.

291 Ms Fichaut underlined that IOC-IODE is part of the SeaDataCloud consortium and will be involved in the training effort of the project for the organisation of the training workshop at IODE headquarters in Ostend (the training material will be made available on OceanTeacher system), and also in the organisation of the two IMDIS international conferences planned in the project (all the presentations will become available as web videos on IOC-IODE's OceanTeacher e-publishing and e-learning platform).

292 **The Committee welcomed** the involvement of IODE in the SeaDataCloud project through the OceanTeacher Global Academy and IOC Project Office for IODE.

3.5.3.4 ECOPOTENTIAL

293 This agenda item was introduced by Mr Ward Appeltans.

294 Mr Appeltans recalled that ECOPOTENTIAL is a European Commission Horizon 2020 project on Making Earth Observation and Monitoring Data usable for ecosystem modelling and services (http://www.ecopotential-project.eu/). This project is Europe's contribution to GEO Ecosystems, one of the nine societal benefit areas of the Group on Earth Observations (GEO). It will use Earth Observation and in-situ monitoring data and new modelling approaches to assess ecosystem services in current and future conditions, and use this information for planning and management of protected areas (of which several UNESCO world heritage sites).

295 The OBIS secretariat, together with the University of Western Brittany (France) and other partners, are building a pilot study based on the distribution of cetacean populations (in particular fin whales and striped dolphins) and associated benefits to humans in the Pelagos Sanctuary (an international marine protected area in the Mediterranean). The project will support management and research organisations active in the Sanctuary to better understand the human-nature dynamics and understand which are the areas where greatest intervention or change in management practices is required.

296 OBIS plays an important role in data and information management and acts as a data sharing facility. The OBIS database is now brokered with the GEO portal thanks to the development of a powerful RESTful JSON API on OBIS. The next steps will focus on the development of a data analysis workflow/model and publish the output via the GEOSS virtual laboratory platform.

297 **The Committee welcomed** the collaboration of OBIS in the ECOPOTENTIAL project as an example of an initiative which involves all IOC functions.

3.5.4 ICSU World Data System (WDS)

298 This agenda item was introduced by Dr Lesley Rickards on behalf of Dr Mustapha Mokrane, Executive Director, International Council for Science World Data System (ICSU-WDS).

299 The mission of the ICSU-WDS is to promote long-term stewardship of, and universal and equitable access to, quality-assured scientific data and data services, products, and information across a range of disciplines in the natural and social sciences, and the humanities. WDS was established by ICSU in 2009, building on the recognized legacy of its World Data Centres and Federation of Astronomical and Geophysical data analysis Services. Dr Rickards reminded the Committee that IODE had a long and fruitful relationship with the WDCs for Oceanography, and this relationship is continuing and being strengthened under WDS – in particular as IODE is a Network Member.

300 The WDS International Programme Office (WDS-IPO) coordinates the daily operations of ICSU-WDS and implements the decisions of the WDS Scientific Committee (WDS-SC). The IPO organizes meetings of the SC and the biennial WDS Conference, as well as conducting outreach and promotional activities. Following a new agreement with International Council for Science (ICSU), the WDS-IPO will be hosted and financially supported until 31 March 2021 by the National Institute of Information and Communications Technology (NICT) in Tokyo, Japan.

301 Dr Rickards noted that Member Organizations of ICSU-WDS from wide-ranging fields are the building blocks of a worldwide ‘community of excellence’ for scientific data (including both natural and social science data). Not only do these Members participate in advancing WDS goals; their data holdings, services, and products are the cornerstone of the federated data system. Currently, ICSU-WDS has 104 Member Organizations in four different categories (68 Regular, 10 Network, 8 Partner and 18 Associate Members).

302 Key ICSU-WDS activities include:

303 (i) ICSU-WDS and the Data Seal of Approval (DSA) Board announced (Nov 2016) the availability of their unified Core Trustworthy Data Repository Requirements. This was developed through a DSA–WDS partnership Working Group within the Research Data Alliance (RDA). This catalogue of requirements will be used for the certification of WDS Regular Members as Trustworthy Data Repositories.

304 (ii) Four Working Groups—Bibliometrics, Cost Recovery, Services, and Workflows—were established under an umbrella Publishing Data WG and endorsed by RDA to address essential and practical issues in order to help enable the publication of research data as part of the scholarly record. The main objective being to identify and define best practices for publishing data and to test their implementation.

305 (iii) ICSU-WDS co-organised the International Data Week (11-17 Sep 2016) with CODATA—the Committee on Data of ICSU—and the Research Data Alliance (RDA), which attracted more than 850 data scientists, researchers, industry leaders, entrepreneurs, policymakers, and data stewards from all disciplines and from across the globe, including some from IODE.

306 **The Committee noted** its support to ICSU WDS through the GODAR and WOD

projects and **re-iterated** its commitment to continue this cooperation.

307 **The Committee agreed** to discuss with ICSU WDS ways and means to provide content for the WDS metadata catalogue through existing IODE and partner systems such as ODP, OBIS, EMODNET, SeaDataCloud and others, and possibly IODE information product metadata as well (OceanDocs, OceanDataPractices,…).

308 **The Committee invited** projects and initiatives such as EMODnet, SeaDataCloud and others, to continue making their public access oceanographic data available freely and without restriction of use and distribution to the IODE community in a timely manner. Such ocean data from these projects and initiatives could be added and enhance IODE international data products such as the World Ocean Database and onwards transmission to WDS.

3.5.5 Research Data Alliance (RDA)

309 This agenda item was introduced by Ms Cyndy Chandler. She referred to **Document IOC/IODE-XXIV/3.5.5** (***Brief report on cooperation of IODE in the Research Data Alliance***).

310 Ms Chandler explained that she represents IODE in the Research Data Alliance (RDA; http://rd-alliance.org). Concerns of interest to the oceanographic data community are discussed among members of the Marine Data Harmonization Interest Group (MDH IG) of which Chandler is a co-chair. The RDA MDH IG is a science-domain focused interest group whose members are actively engaged in the management of marine data and metadata, and similar related activities within existing networks of marine data centers/repositories. This interest group creates and tests marine data use-cases, and collects feedback from active marine data managers, researchers and other stakeholders to improve the maturity and robustness of the specifications and recommendations of the other relevant RDA Working Groups. A broader goal is to underpin improvements in marine data management in areas such as interoperability between relevant efforts in the marine domain. Since April 2015, the MDH IG has identified several key areas as being of interest to people responsible for stewardship of marine data. During the most recent IODE intercessional period the MDH IG has actively engaged with several other RDA groups, most notably: Brokering; Data Citation; Data Description Registry Interoperability; Data Foundation and Terminology; Data Publication; Data Type Registries; Fisheries Data Interoperability; Metadata Standards; PID Information Types; Practical Policy; Repository Audit and Certification DSA–WDS Partnership; Active Data Management Plans; Biodiversity Data Integration; Data Fabric; Domain Repositories; and Metadata and Persistent Identifiers (PID).

311 **The Committee welcomed** the participation of its Co-Chair in RDA as RDA has the potential to enrich IODE with expertise on new technologies and practices related to data and information management and **invited** IODE Committee members to participate in RDA.

3.5.6 2nd International Indian Ocean Expedition (IIOE-2)

312 This agenda item was introduced by Ms Cyndy Chandler. She referred to **Document IOC/IODE-XXIV/3.5.6** (***Brief report on cooperation of IODE in the International Indian Ocean Expedition IIOE-2***).

313 The IODE has provided initial support for data and information management activities for the nascent Second International Indian Ocean Expedition (IIOE-2; http://www.iioe-2.incois.gov.in/). Information about the IOC endorsed global research program is available from the URL links above. MS Cyndy Chandler Cco-chair of IODE) provided early guidance to the Interim Planning Committee in 2015. The IODE Secretariat and representatives of member states provided feedback to the planning committee drafting the IIOE-2 Implementation Plan. Members of IODE including Ms Cyndy Chandler, Dr Albert Fischer, Dr Somkiat Khokiattiwong, Mr Peter Pissierssens, Mr Greg Reed, and Ms Lucy Scott

participated in several teleconferences during 2015 when the plan was being drafted. Ms Chandler, with support from the IODE Secretariat, drafted the section on Data and Information management. Peter Pissierssens attended the face-to-face Implementation Plan drafting workshop hosted at the Indian National Centre for Ocean Information Services (ESSO-INCOIS) in Hyderabad, India in October 2015. Ms Chandler and Mr Harrison Ong'anda of Kenya were selected to co-chair the Data and Information Management Working Group, one of seven that were formed in 2016 and contribute to the IIOE-2 Steering Committee.

314 Mr E. Pattabhi Rama Rao, India briefed the Committee that based on the objectives and actions items 5.2.10 and 8.2.2 listed in the document on 'Implementation Strategy for the Second International Indian Ocean Expedition', a web-site for IIOE-2 is developed and hosted on INCOIS Website (www.iioe-2.incois.gov.in). Further, the data portal for hosting data and meta-data collected under the IIOE-2 programme is also developed. The metadata interface features ISO 19115 standards compliant for representation of metadata information, GCMD Science Keywords for controlled keyword search and facilitates spatial, temporal, text based search for metadata. The portal also provides facility for submission of the metadata by the participating agencies. The data portal is developed under the guidance of the Interim Planning Committee (IPC) and Joint Project Offices (JPOs) of IIOE-2 initially. He informed the Committee that the portal is being tested and the web-link will be provided to the IIOE-2 Working Group on the Data Management and the IODE committee for comments and to go live.

315 Ms Chandler briefly reported on the Sessional Working Group for IIOE-2 that had met the previous day. The attendees included Dr Nick D'Adamo (IOC Perth Office), Mr E. Pattabhi Rama Rao (INCOIS, Hyderabad, India), delegates from Member States that have or expect to propose active IIOE-2 research programs, either research cruises or mooring deployments, many IODE project chairs, and JCOMM. The participation from Member States was especially important as IIOE-2 will rely on the NODCs and ADUs from those countries to contribute the data from IIOE-2 research efforts to the IIOE-2 Project Data System hosted at INCOIS in Hyderabad.

316 Representatives of the IIOE-2 Steering Group, and the members of the D&IM WG in particular, invited any contributions that IODE Committee members would care to make as they work to achieve the activities described in the IIOE-2 Implementation Strategy.

317 **The Committee thanked** India (INCOIS) for hosting the IIOE-2 project office, web site and related metadata and data services.

318 **The Committee welcomed** the active participation of IODE in IIOE-2 through Ms Cyndy Chandler and Mr Harrison Ong'anda as Co-Chairs of the Data and Information Management Working Group.

319 **The Committee invited** NODCs, ADUs and marine libraries in the Indian ocean region to participate actively with the management, exchange and archival of IIOE-2 data and information.

320 **The Committee called on IIOE-2** to deposit IIOE-2 documentation in the OceanDocs repository and IIOE-2 expressed appreciation for the availability of the OceanDocs repository as the official repository for IIOE-2.

321 **The Committee recommended** that IIOE-2 should develop a data management plan.

322 **The Committee invited** Member States and their experts participating in the IIOE-2 programme to apply the IOC oceanographic data exchange policy.

3.5.7 Research Coordination Network (RCN): Sustained Multidisciplinary Ocean Observations (RCN:OceanObsNetwork)

323 This agenda item was introduced by Ms Cyndy Chandler, IODE Co-Chair. She referred

to **Document IOC/IODE-XXIV/3.5.7** (***RCN-OceanObsNetwork***)

324 Ms Chandler explained that the OceanObs RCN (http://sites.ieee.org/oceanrcn/) was first funded in 2012 by the US National Science Foundation and is planned to continue for at least another five years.

325 She explained that the main objective of the OceanObs RCN is to evaluate the strategies by which relevant information about the ocean is made available in a timely manner to those who require it. The OceanObs RCN is especially interested in fostering collaboration with the IODE to promote: "*the importance of measuring life in the ocean (species, abundance productivity and how they are changing), concurrently with physical and chemical observations in support of a sustainable resource assessment, management, conservation, and use paradigm"*.

326 Ms Chandler also reported that over the preceding five years the OceanObs RCN has fostered a broad, multi-disciplinary dialogue, enabling more effective use of ocean observing systems, consistent with national and international efforts, to inform societal decisions. The RCN has organized workshops for interdisciplinary exchanges and reviews of advanced research in ocean science with two to three meetings per year. Workshops have focused on interdisciplinary collaboration for monitoring of Essential Ocean Variables (EOV), specifically to promote the collection of physical, biogeochemical, and biological/biodiversity data to target problems of societal relevance. Early career professionals from the international community are actively invited to the annual RCN meetings. These meetings have been sponsored by the IOC's Global Ocean Observing System (GOOS), agencies including the National Science Foundation, NASA, NOAA, and professional societies such as the IEEE.

327 The leaders of the OceanObs RCN are interested in active collaboration with the IODE over the next intersessional period including activities intended to reach broader communities and address the emerging areas of biological and biodiversity observations in a multidisciplinary way. Potential synergistic RCN and IODE cooperative activities could include:

(i) supporting OceanObs'19 (September 16-19, 2019, Hawaii)

(ii) supporting the objectives and activities of IODE

(iii) research, capacity building, technology development and technology transfer activities that address UN Sustainable Development Goals, and in particular SDG 14.

(iv) strengthening the collaboration between the Group on Earth Observations Marine Biodiversity Observation Network (GEO MBON), GOOS, and OBIS. The effort would deepen linkages with the GEO Blue Planet, AmeriGEOSS, AfriGEOSS, GEO-CCIOACZ, and other GEO elements, each of which includes extensive capacity building efforts.

(v) promoting a culture of open data for sustained, operational observations about life in the ocean, concurrent with physical and biogeochemical observations.

(vi) identifying the needs, opportunities and barriers to improved/expanded industry involvement in ocean observations, and develop the 'value proposition/business case' for this in collaboration with the private sector. Working with industry groups (e.g. WOC and PEMSEA) to ensure that ocean observations have broader impact and value, especially in the new blue economy.

(vii) considering the proposal of a 10-20 year cornerstone effort to measure life in the ocean, including developing the capacity, methods and technologies, in a manner consistent with physical and biogeochemical observations and to implement a global MBON, based on a collaborative effort between the IOC and GEO, and specifically between IODE/OBIS, GOOS, and MBON.

328 Ms Chandler noted that the final bullet (10-20 year cornerstone effort) would align well

with the IOC Medium-Term Strategy proposed for 2014-2021. Also, she observed that the RCN could help to strengthen the connections between IODE, JCOMMOPS and GOOS.

329 Finally, Ms Chandler informed the Committee that the OceanObs RCN hosts annual workshops (often in December one day prior to the American Geophysical Union Meeting), and that summary reports from the workshops as well as workshop presentations are available online, and files can be downloaded from the RCN Web site (http://sites.ieee.org/oceanrcn/).

330 **The Committee welcomed** the involvement of IODE in the Research Coordination Network (RCN): Sustained Multidisciplinary Ocean Observations (RCN:OceanObsNetwork) through the participation of the IODE Co-Chair (Ms Cyndy Chandler) as a way for IODE to work more closely with GOOS. OceanObs '19 will be a high profile event in which IODE should participate.

331 **The Committee requested** IODE/OBIS to consider the proposal of a 10-20 year cornerstone effort to measure life in the ocean, including developing the capacity, methods and technologies, in a manner consistent with physical and biogeochemical observations and to implement a global MBON, based on a collaborative effort between the IOC and GEO, and specifically between IODE/OBIS, GOOS, and MBON.

332 **The Committee requested** its Co-Chair, Ms Cyndy Chandler to discuss with RCN modalities for increased collaboration with RCN:OceanObsNetwork. In this regard the Committee wished to inquire about possible funding by RCN of workshops on data standards and interoperability.

3.6 PROGRESS REPORTS OF REGIONAL ACTIVITIES

333 This agenda item was introduced by Ms Cyndy Chandler, IODE Co-Chair.

3.6.1 ODINAFRICA

334 This agenda item was introduced by Ms Arame Keita. She referred to **Document IOC/IODE-XXIV/3.6.1**.(***Ocean Data and Information Network for Africa***)

335 She recalled that the fourth phase of ODINAFRICA project which ended in August 2016 was supported by the Government of Flanders (Kingdom of Belgium). The achievements of this phase included the extension and strengthening of the network of marine scientists as well as ocean data and information managers, capacity development in a wide range of aspects of data and information management, development of several products such as: AgriOcean/DSpace software and its use in developing OceanDocs database, the African Register of Marine Species, the SmartAtlas software and the related suite of African Coastal and Marine Atlases, the African node of the Ocean Data portal. She further informed the Committee on the results of the project on the "Review and Consolidation of ODINAFRICA Services and Products: 1989–2015 – ODINAFRICA Connect" that had been implemented in 2015-2016.

336 The Committee was informed of the relevant recommendations of the 4th Session of the IOC Sub-Commission for Africa which was held in Alexandria, Egypt between 6-8 March 2017:

(i) NODCs & Information Centers should ensure that their websites are updated

(ii) update of the African Coastal and Marine Atlases is very important. The move from SmartAtlas should be explored and implemented to improve access to ACMA.

(iii) development of Ocean Data portal for Africa is a priority

(iv) focus on Marine Biodiversity is required as little is done on this in the region

(v) Marine Spatial Planning

(vi) establishment of IOCAFRICA Group of Experts on Ocean Data and Information Management to:

- o develop proposals for joint activities to keep the ODINAFRICA network active
- o develop follow-up proposals focusing on the improvement and use of the African Coastal and marine atlases for coastal management.
- o strategies for improving interactions with users (and potential users) of NODC& Informations Centers services and products should be improved

337 These resulted in a proposed work plan that would include (for the next inter-sessional period):

(i) Development of the African Coastal and Marine Atlases (ACMA) - upgraded and updated to support sustainable management of the marine and coastal zones of Africa. The ACMA team will work with the Caribbean Marine Atlas team to improve functionality of ACMA and enable the incorporation of new products.

(ii) Development of an African Ocean Data and Information portal connected to IODE Ocean Data Portal to improve access to ocean data and information

(iii) Developing and implementing a marine biodiversity and biogeography program, building on the African Register of Marine Species(AFREMAS) and the African node for the Ocean Biogeographic Information System (AfrOBIS)

338 **The Committee welcomed** the successful completion of the ODINAFRICA-IV project and the various products and services that have been developed.

339 **The Committee welcomed** the focus on marine biodiversity and **acknowledged** the offer of OBIS to assist ODINAFRICA to develop this additional capacity .

340 **The Committee urged** African Member States to develop a project proposal to ensure that the expertise, products and services developed during the past ODINAFRICA projects is not lost and would continue to contribute to the sustainable management of African coastal areas. In this regard it was noted that the Flanders-UNESCO Trust Fund for Science will accept new proposals in 2018.

3.6.2 ODINBLACKSEA

341 This agenda item was introduced by Mr Emre Gülher, on behalf of Mr Murat Elge, Project Coordinator. He referred to **Document IOC/IODE-XXIV/3.6.2**.(***Ocean Data and Incformation Network for the Black Sea region***).

342 Mr Gülher recalled that the ODINBLACKSEA Project was established during the XIXth Session of the IODE Committee (Trieste, Italy, March 2007) through the Recommendation IODE-XIX.10 with the main objectives of increasing the collaboration amongst the Black Sea Nations and establishing an oceanographic data and information network in the Black Sea. He acknowledged the membership of the Project and briefly described the objectives.

343 During the past intersessional period the following activities were implemented: (i) One Steering Committee (SC) Meeting was conducted between 28 September – 01 October 2015 in Varna/Bulgaria with the participation of representatives of all member states in the region. The SG Meeting was hosted by the Bulgarian National Oceanographic Data Centre, Institute of Oceanology, Bulgarian Academy of Science; (ii) The Project Document dated March 2007 was revised for approval by the IODE Committee; (iii) Mr. Murat Elge from Turkey was elected as the new Project Coordinator; (iv) Contact was established with the Commission on the Protection of the Black Sea Against Pollution (Black Sea Commission) about possible collaboration; (v) New Ukrainian NODC was established; (vi) The Black Sea Nations' Research Vessels' Black Sea Cruise Plan for 2017 was prepared; (vii) Survey questionnaire regarding real-time stations in the Black Sea region and inventory of these stations were

prepared; (viii) Project web site was re-established.

344 Mr Gülher then introduced the action items to be conducted during the next inter sessional period of 2017-2019: (i) 2 SC Meetings will be held; (ii) 2 Capacity Building Activities will be held. (ODP training in IOC Project Office for IODE or in Russian NODC, Data Management and Collection training in Turkish NODC); (iii) Research Vessels Work Plan Documents for 2018 and 2019 will be prepared; (iv) The Black Sea Expedition Scientific Document will be prepared; (v) The inventory of databases and meta-databases of the Member States will be prepared; (vi) Collaboration opportunities with the Black Sea Commission through its Advisory Group on Information and Data Exchange will be sought; and (vii) Assistance in the development, operation and strengthening of National Oceanographic Data (and Information) Centres and Associate Data Units (ADU) of the Black Sea Countries will be provided oceanographic data and information network will be established amongst them by applying IOC/IODE Ocean Data Portal (ODP).

345 **The Committee approved** the revised Project Document and **decided** to continue the ODINBLACKSEA project.

346 **The Committee recommended** that the region should also consider more activities related to OBIS.

3.6.3 ODINCARSA-LA

347 This agenda item was introduced by Mr Ariel Troisi, Project Coordinator. He referred to **Document IOC/IODE-XXIV/3.6.3**.(***Ocean Data and Information Network for the Caribbean and Latin America***).

348 Mr Troisi highlighted the activities implemented and results achieved during the inter-sessional period, including the participation in CMA2, SPINCAM and CLME projects.

349 Mr Troisi noted that despite the fact that the region continued suffering from extremely limited financial resources to support activities, the establishment of the OTGA RTC at INVEMAR, Santa Marta, Colombia, constituted an important turn of events as it provides a necessary hub for continuing capacity development in the region. Furthermore, the candidacy of Nova Southeastern University, Florida, USA, as RTC provides the necessary means to ensure CD activities for English speaking countries in the region.

350 An asymmetrical distribution of capacities in terms of human resources and infrastructure continues to be a challenge that requires, inter alia, support for the development of DM and MIM at basic and advanced levels including the development of products and services.

351 In line with the recommendations of the IODE XXIII Committee Meeting, closer contact was established with on-going projects that have a data and information management component or require data and information management expertise, as well as with the IOCARIBE Secretariat.

352 The direct link between IODE/ODINCARSA-LA and the GOOS GRA for the Tropical and Upper Southwest Atlantic (OCEATLAN) was strengthened and the IOC Manuals and Guides No. 73 was distributed as a guide for best practices.

353 USA asked about any activities in support of GODAR, and OBIS reminded the Committee of the resources offered by OBIS. ODINCARSA-LA acknowledged their interest in opening an OBIS chapter.

354 Mr Eduardo Klein (SG-OBIS Co-Chair) reported on the activities of OBIS in the CARSA-LA region (training courses, establishment of new OBIS nodes and support to CMA2) and requested ODINCARSA-LA to support OBIS as a platform for regional coordination and cooperation in marine biodiversity data management.

355 **The Committee welcomed** the establishment of a OceanTeacher Global Academy

Regional Training Centre (RTC) at INVEMAR, Santa Marta, Colombia and **noted with appreciation** the high level of activity at the new RTC.

3.6.3.1 Caribbean Marine Atlas (phases 1 and 2)

356 This agenda item was introduced by Mr Francisco Arias, Project Coordinator via video conferencing. Mr Arias recalled that IOC/UNESCO, with financial support from the Government of Flanders (Kingdom of Belgium) and the Marine and Coastal Research Institute INVEMAR as project coordinator, are executing the Caribbean Marine Atlas project (phase 2). The main objective is the sustainable operationalization of an online digital technological platform as a support of ICZM with special attention to: coastal hazards, climate change, biodiversity and habitats, fisheries, land-based sources of pollution, and Ecosystem-based Management for CLME. The online platform, based on GeoNode technology, has been implemented in selected countries for regional and national level consultation and decision making (http://www.caribbeanmarineatlas.net/). The project is working on 8 regional indicators according to national information (or regional), as well as on the publication of 10 thematic maps (Caribbean base, Bathymetry, Coral reef, Seagrasses, Mangrove, Marine Protected Areas, Biosphere Reserves, Hurricane track, Oceanography and meteorological stations, and Tools Management), which the national partners are currently reviewing to identify the sources of cartographic layers. The atlas currently has 178 thematic layers and 7 online maps, with documents, calendar, news and 35 special users to manage the countries' information, with INVEMAR support. The project has participated in several congresses, and published a note in the ICAN newsletter. There is a project flyer and a project brochure is being prepared as part of the project communication plan. Furthermore, inter-regional technical expertise exchange is taking place between CMA2 and ACMA (African Coastal and Marine Atlas). A proposal has been made to organize a short course on Geonode-CMA2 at the 28th International Congress for Conservation Biology (ICCB) (2017). In addition, an online training course is planned for technicians of the CMA2 country partners.

357 Mr Arias then highlighted the following achievements:

(i) 10 countries formally participating (marked *): *Barbados, *Belize, *Colombia, *Dominica, *Guatemala, *Jamaica, *Mexico, *Panama, Trinidad & Tobago, *Dominican Republic, Turks & Caicos and *Venezuela, and 2 more informally participating;

(ii) Online technological platform active with potential for replication in several initiatives (ACMA; SPINCAM);

(iii) 8 Indicators in implementation process (Coral Health, Marine and coastal protected areas, Sea level rise, Coastal population density, Fisheries total catch by country, Frequency magnitude and assessment of natural disasters impact, Threatened species and Invasive species);

(iv) 10 Regional thematic maps in development process (Caribbean base map, Bathymetry, Coral reef, Seagrasses, Mangrove, Marine Protected Areas, Biosphere Reserves, Hurricane track, Oceanography and meteorological stations, and Tools Management);

(v) Events: CiiMAR-GoMC 12th Consortium of Marine Research Institutes of the Gulf of Mexico and Caribbean Sea on 2016 (Mexico), 2nd Coastal Area Integrated Management Ibero American Congress on 2016 (Brasil), Marine GIS course training as study case (2015 and 2016), Colombian events on environmental sector on 2016 and 28th ICCB on 2017.

358 **The Committee welcomed** the progress made by the CMA2 project in building a regional marine atlas and its sharing of expertise and infrastructure resources thereby responding to the IOC CD strategy. **The Committee further welcomed** the coverage of indicators, as an early contribution to the SDGs.

359 **The Committee welcomed** the collaboration between CMA2 and ACMA as an excellent example of south-south cooperation.

3.6.3.2 CLME+

360 This agenda item was introduced by Ms Paula Sierra via video conferencing. Ms Sierra explained that the concept of Large Marine Ecosystems (LME's) has been proposed by NOAA, and has subsequently been adopted by the Global Environment Facility (GEF), as a meaningful geospatial unit to promote an ecosystem approach to the management of shared marine resources. With the financial support of the UNDP/GEF "CLME+ Project", and in collaboration with several partner agencies including IOCARIBE (IOC of UNESCO), UNEP CEP and FAO-WECAFC, member countries jointly delivered a 10-year Strategic Action Programme (SAP) "for the Sustainable Management of shared Living Marine Resources" for the Caribbean and North Brazil Shelf LME's (these LME's are now further jointly being referred to as the "CLME+ region"). Subsequent to the collaborative development of the SAP (2012-13) and its region-wide technical clearance (2013), the "CLME+ SAP" (2015-2025) has been endorsed at the political level: to date (February 2017), the SAP has been signed by a total 34 Ministers with portfolios relating to environment, fisheries, and foreign affairs. Jointly, these Ministers represent 25 countries from the CLME+ region. The CLME+ SAP therefore now provides a formally adopted common roadmap for CLME+ countries, and the main regional coordination mechanism to deliver against marine-related international environmental and development targets in the CLME+ region, such as the Aichi Targets and the UN Sustainable Development Goal 14.

361 SAP implementation is now being catalyzed through a new UNDP/GEF Project, the "CLME+ Project" (2015-2020), for which the IOC of UNESCO acts as a Co-executing Partner. Successful implementation of the CLME+ SAP requires the implementation of a SAP Monitoring & Evaluation mechanism, with geospatial component.

362 It is in this context that support is being provided by the IODE of UNESCO, through the FUST/IOC of UNESCO "Caribbean Marine Atlas – Phase 2" (CMA2) Project. Under this project, technically implemented by INVEMAR, Colombia, financial support for the amount of USD 180.000 is provided by the IOC of UNESCO to the UNOPS-run CLME+ regional Project Coordination Unit through a UN-to-UN Agreement, enabling the co-financing of the position of the CLME+ "Environmental Mapping & Reporting Specialist" (EMRS) over the 2016-2018 period.

363 With CMA2 and CLME+ sharing the objective of providing better information for decision-makers to support successful SAP implementation, the EMRS acts as the technical liaison between the INVEMAR CMA2 and UNOPS CLME+ teams, and their partner organizations.

364 The EMRS is coordinating efforts towards SAP M&E institutionalization with a wider number of regional organizations with a mandate for the marine environment, including: UNEP CEP, FAO-WECAFC, UNDP, IOCARIBE, CRFM, OSPESCA, OECS and IODE, among others. It is expected that Member States of this organizations will endorse the M&E mechanism during their inter-governmental meetings.

365 In this context, EMRS will be coordinating the development of a region-wide reporting mechanism on "the State of the Marine Environment in the CLME+ region", with associated supporting data portals. IODE support, through INVEMAR, therefore includes the development and implementation of the Geonode technology for the Caribbean Marine Atlas – CMA (amount unknown to me, to be provided by IODE or INVEMAR). EMRS and INVEMAR will work closely on the publication of SAP-relevant geospatial information in the CMA.

366 **The Committee welcomed** the close collaboration between CMA2 and CLME+ as an example of interagency collaboration.

3.6.4 ODINCINDIO

367 This agenda item was introduced by Ms Cyndy Chandler, Co-Chair. Ms Chandler recalled that IOCINDIO had been established as the IOC Regional Committee for the Central Indian Ocean in 1982.The 4th Session of IOCINDIO (December 2005) had discussed the ODINCINDIO project proposal which was proposed by the 17th Session of the IODE Committee (2003). The proposal was also accepted by the IOGOOS as a capacity building tool and it was also supported by ROPME. Unfortunately, since 2005 the IOCINDIO activities were implemented very slowly and there were no sessions of IOCINDIO until the 5th Session, held in Chennai, India, 25-27 April 2016. Similarly, no actions were taken regarding the implementation of ODINCINDIO. In February 2012, the IODE Officers called on IOCINDIO Member Stats to more actively participate in realizing ODINCINDIO. At the EC-XLI (June 2012) Thailand and India urged the IOC Secretariat to support and help re-activate IOCINDIO. Since then the Islamic Republic of Iran established a UNESCO Category II Centre on ocean and coastal zone research and training for the Persian Gulf and the Oman Sea. In January 2013 IOC Circular Letter 2467 (Data and Information Survey in the Area of the Persian Gulf and Oman Sea) called on all Member States of the IOCINDIO region to (i) provide information on sea and coastal research institutions, ocean data centres and marine libraries in their country; (ii) provide information on sea and coastal research and observations experts, data management experts and marine librarians; and (iii) expression of interest to participate in discussions on the possible establishment of a sub-regional Ocean Data and Information Network for the Persian Gulf and Oman Sea region. Only two member states responded to the Letter.

368 At IODE-XXIII lack of progress was reported again. Saudi Arabia, India and Thailand expressed interest in the continuation of the ODINCINDIO project. The Committee then requested interested Member States to meet on an *ad* hoc basis and to propose a way forward. The Committee had further recommended that a scientific conference be held in the region as an effective way to revive ODINCINDIO. India offered to host such a conference, relating the event to the IIOE2. While IIOE2 has since started no specific actions related to ODINCINDIO have been undertaken.

369 The 5th Session of the IOCINDIO was held in April 2016. The Executive Summary of the meeting is available as Document IOC/IOCINDIO-V/3s.

370 It was further noted that Mr Peter Pissierssens had participated in the “2nd Annual Marine Data Infrastructure GCC 2017”, Dubai, 30-31 January 2017 where the need for guidelines as well as training in data quality control, data policy and other data management procedures had been expressed. This would be further discussed at IOCINDIO-VI.

371 It was noted that the 6th Session of IOCINDIO was planned to be held in Kuwait between 22-25 May 2017. Requirements related to oceanographic data and information management and exchange may emerge from that meeting. That information will be conveyed to the IODE Officers.

372 Several Member States expressed their support for reactivation of ODINCINDIO.

373 Dr Zaker offered to seek resources to organize a regional workshop in the region to re-launch ODINCINDIO.

374 **The Committee recommended** the re-activation of the ODINCINDIO project and invited Dr Nasser Zaker (Islamic Republic of Iran) to take the lead in this effort.

375 **The Committee requested** Dr Zaker to discuss ODINCINDIO at the upcoming IOCINDIO Session.

3.6.5 ODINECET

376 This agenda item was introduced by Ms Linda Pikula on behalf of Ms Olga Akimova, Project Coordinator. She referred to **Document IOC/IODE-XXIV/3.6.5**.(***ODINECET***)

377 In her presentation, she recalled that the project aims at assisting marine libraries in European Countries in Economic Transition and during the inter-sessional period 2015-2017 the following activities were implemented: (i) Meeting of the ODINECET Steering Group was held in Rome, Italy 7th and 11th September, 2015. (ii) Koha electronic catalogue was developed and hosted now at Cloud technologies http://marine-research.org/. IODE allocated funding for Koha implementation in 2015. Future designing is still needed. (iii) A webserver where IBSS and CEEMaR repositories existed was broken when the Crimea switched to autonomous reserve power after transmission towers in the adjacent Ukrainian Kherson region were put out of commission, causing a blackout. This happened on 21 November 2015. After some efforts to recover webserver it was found inoperative. In November 2016, the Institute (IMBR) acquired a new powerful webserver and uploading of backups of IBSS and CEEMaR Repositories is expected. (iv) Other ODINECET initiatives and projects are under elaboration and implementation. They intend to elect a new lead at their next meeting.

378 **The Committee expressed its regret** regarding the loss of the CEEMaR repository and **urged** all data and information centres to ensure effective and efficient back-up systems for its data and information services, and **noted** that OceanDocs is now being used for CEEMaR's deposits.

3.6.6 ODINWESTPAC

379 This agenda item was introduced by Dr Yu Ting (representing Dr Shi Suixiang, Project Coordinator of ODINWESTPAC), referring to **Document IOC/IODE-XXIV/3.6.6.** (***Ocean Data and Information Network for the Western Pacific Region***).

380 She reported that the side meeting of ODINWESTPAC took place on May 14, 2015 during IOC/WESTPAC-X (12-15 May 2015) in Phuket, Thailand, and the First Session of the Advisory Group for ODINWESTPAC was held in Tianjin, China, 27-28 January 2016, co-sponsored by the Government of China, attended by 12 participants from 6 member states. Dr Yu Ting on the following results achieved during the inter-sessional period:

(i) web site developed (http://www.odinwestpac.org);
(ii) regional data and information products updated;
(iii) collaboration with other projects on enhancing the regional capacity building activities.

381 She further reported vision on developing the Project by initiate R&D on regional climate statistical and ocean reanalysis products, collaboration on sea level rising assessment and sharing the best practice on Blue Economy classification standards and statistical methodology.

382 ODINWESTPAC will organize a Regional workshop in May 2017, to demonstrate the advantages, cost/benefit and products that can be derived from national oceanographic data management facilities and also from the efficient operation of ODINWESTPAC. A detailed work plan was presented, and the Committee was informed that so far activities are proceeding according to schedule.

383 The Committee was further reminded that ODINWESTPAC had, to date, not been formally established as an IODE Project.

384 The delegate from Malaysia (Dr Aidy Muslim) informed the Committee that it has submitted an application to establish an OBIS node (as ADU) and is considering to organize and host an OBIS course in 2017 at its OTGA RTC.

385 Mr Eduardo Klein (SG-OBIS Co-Chair) reported that the SG-OBIS, at its 6th session last month in Okinawa (Japan), approved the Asian OBIS strategy presented by Japan, which aims to revitalize local OBIS node activities in the Asian region through (i) the construction of a regional node network to promote cooperation between existing OBIS nodes and (ii) provision of technical support to new OBIS nodes in Asia. The upcoming IOCWESTPAC meeting (April 2017) was identified as an important meeting to introduce the Asian OBIS node activities and increase the visibility of OBIS in the region.

386 **The Committee thanked** China for its active role in the development process of ODINWESTPAC and for the considerable support provided to various ODINWESTPAC meetings.

387 **The Committee adopted** Recommendation IODE-XXIV.4 (ESTABLISHMENT OF THE OCEAN DATA AND INFORMATION NETWORK FOR THE WESTERN PACIFIC REGION (ODINWESTPAC) PROJECT)

3.6.7 Other

388 This agenda item was introduced by Ms Cyndy Chandler. She invited the Committee to intervene on any other regional activities or issues that require the Committee's attention.

389 There were no interventions or issues under this agenda item.

3.6.7.1 IIOE-2: see 3.5.6

4. IODE CAPACITY DEVELOPMENT

390 This agenda item was briefly introduced by Prof Yutaka Michida, Co-Chair.

4.1 THE IOC CAPACITY DEVELOPMENT STRATEGY

391 This agenda item was introduced by Dr Claudia Delgado on behalf of Mr Peter Pissierssens. She referred to **Document IOC/IODE-XXIV/4.1** ((***Report on the IOC Capacity Development Strategy and its implementation***) and **Document IOC/INF-1332**.

392 Dr Delgado recalled that the 27th Session of the IOC Assembly (2013) established (through Decision IOC-XXVII/Dec.5.5.1) an Intersessional Working Group for Developing a Draft Strategic Plan for Capacity Development. It tasked this Group to develop a Capacity Development (CD) Strategic Plan for IOC. This plan would then be implemented through partnership with Member States, donors, UN Agencies, global financial institutions and the private sector. Initially the Group was instructed to submit its work to the 47th Session of the IOC Executive Council in 2014. The IOC Executive Council, at its 47th session, noted that the work was not completed and, through Decision EC-XLVII/Dec. 6.1, had decided to reconstitute the Intersessional Working Group for the IOC Capacity Development Strategy and had instructed the Chair of the Group (Prof Adoté Blivi) to submit the final draft of the IOC Capacity Development Strategy and associated documentation to the 28th Session of the Assembly (2015). The IOC Assembly, at its 28th Session (2015) adopted the Strategy through Resolution XXVIII-2 (IOC Capacity Development Strategy (2015–2021) which was subsequently published as IOC/INF-1332.

393 The strategy contains a vision statement:

"*Through international cooperation, IOC assists its Member States to collectively achieve the IOC'S high-level objectives (HLOs), with particular attention to ensuring that all Member States have the capacity to meet them)*

as well as a mission statement:

"The IOC will undertake relevant actions to assist Member States with developing and sustaining the necessary capacity to undertake activities necessary to achieve the IOC vision at the national level as well as at the international cooperation level."

394 The activities and actions undertaken by the IOC within the framework of targeted capacity development will result in several outputs that, through their use by Member States should result in desired "changes" at the national and sub-regional level in areas such as decision-making, policy, governance, and knowledge.

395 A total of **six expected outputs** are identified. They all need to be addressed on a long-term and sustained basis: (i) Human resources developed; (ii) Access to physical infrastructure established or improved; (iii) Global, regional and sub-regional mechanisms strengthened; (iv) Development of ocean research policies in support of sustainable development objectives promoted; (v) Visibility and awareness increased; and (vi) Sustained (long-term) resource mobilization reinforced.

396 The 28th Session of the IOC Assembly stated **t**hat, by the 29th Session of the IOC Assembly, IOC Primary Subsidiary Bodies (global programmes and Regional Subsidiary Bodies) should take the following actions: (i) develop programmatic and regionally relevant capacity development work plans based on this strategy and related needs assessments conducted in a consistent manner, building on ongoing activities and making use of existing training and education facilities; (ii) mobilize resources in order to reinforce the Secretariat staffing of the regional Sub-Commissions, other subsidiary bodies and global programmes; (iii) catalyze capacity development through global, regional, and national programme development, including projects prepared in consultation with Member States with a view to raise extra-budgetary resources; and (iv) enhance collaboration and communication between its global programmes and Regional Subsidiary Bodies, to contribute to (i) and (ii) above.

397 The IOC CD coordinator invited all IOC global programmes (including IODE) as well as the three IOC regional sub-commissions to describe how they currently achieve the six outputs through targeted activities and actions. Document IOC/IODE-XXIV/4.1 provides an overview of the responses received and includes a gap analysis showing which actions are currently not performed at the global as well as regional level.

398 The gap analysis allows us to draw the following conclusions: (i) Neither at the global or regional level is there currently collaboration with UNESCO Chairs; (ii) The most frequently occurring programmatic gaps under “human resources development” relate to “mentoring”, “young scientists award” and to a lesser extent the lack of a “travel grant fund”; (iii) Under “access to physical infrastructure” there is an overall lack of a “register of infrastructure to facilitate access”; (iv) While all regions report activities under “Assist Member States with the development of marine science management procedures and national policies” this does not seem to be addressed by IODE at the global level. This is important considering the IOC priority on SDGs.

399 Dr Delgado reported on the Sessional Working Group (SWG) on Capacity Development that took place on 28 March 2017. China and India attended the SWG. Additionally, JCOMM (Dr Nadia Pinardi) and GTSPP (Dr Charles Sun) were represented, as well as Mr Greg Reed and Dr Claudia Delgado from the IODE Project Office.

400 The SWG addressed the gap analysis on the IOC CD Strategy, and suggested the following actions. Only the global (IODE) activities were considered, as there was no sufficient representation from the regions in the SWG:

(i) Activity 1.1.1: Promote and assist with the establishment of consortia of higher education at the appropriate geographical scale
    a. Proposed Action: Establish a network of higher education institutes to collaborate to promote data management at post graduate level. Potential partners to be contacted include University of Bologna, University of Gent, University of Hawaii.
(ii) Activity 1.1.2 Promote collaboration between UNESCO Chairs and IOC
    a. Proposed Action: Start collaboration with Hydrology Section.
(iii) Activity 1.3.2 Establish or collaborate with other organizations on a mentoring programme
    a. Proposed Action: Use OceanExpert to match skills with needs.
(iv) Activity 1.3.4 Promote and support “young scientist” awards.
    a. Proposed Action: Provide an IODE award for best presentation from young scientist at a conference, e.g. IMDIS.

(v) Activity 2.1.1 Establishing and maintaining a register of infrastructure to facilitate access.
   a. Proposed Action: liaise with already existing databases, such as the POGO research vessel database, expand to include all global research vessels, Eurofleets database (Eurocean).

(vi) Activity 4.2.1 Assist Member States with the development of marine science management procedures and national policies.
   a. Proposed Action/Information: IODE promotes research data management training which contributes to national policies.

(vii) Activity 5.2.1 Foster development of an IOC ocean literacy programme as a community of practice to share experience within and across regions
   a. Proposed Action/Information: this is addressed through joint project EU/IOC Project SeaChange.

401 **The Committee approved** the content of Document IOC/IODE-XXIV/4.1 as well as the proposed actions of the sessional working group for inclusion in the overall IOC CD strategy implementation working document that is being prepared for the upcoming 29th Session of the IOC Assembly.

4.2 IMPLEMENTATION OF THE IOC CAPACITY DEVELOPMENT STRATEGY BY IODE

4.2.1 Progress Report on the IODE OceanTeacher Global Academy project

402 This agenda item was introduced by Dr Claudia Delgado (OTGA Project Manager and IODE training coordinator). She referred to **Document IOC/IODE-XXIV/4.2.1**.(***OceanTeacher Global Academy (OTGA) Project***).

403 Dr Delgado recalled that two OTGA SG Meetings took place during the inter-sessional period. Both OTGA SG meetings took place in Ostend, Belgium (IODE PO), the 2nd OTGA SG meeting took place between 8-11 March 2016 and the 3rd between 21-24 February 2017.

404 She informed the Committee that during the inter-sessional period all candidate RTCs started developing the workplan. Besides the IOC Project Office for IODE in Belgium, six (6) RTCs achieved 'Designated' status given the positive performance (Colombia, India, Kenya, Malaysia, Mozambique and Senegal), while the other three (3) RTCs kept the 'Candidate' status (China, South Africa, USA). A new candidate/observer RTC (INIOAS-Republic of Iran) was assessed in August 2016 and attended the 3rd OTGA SG meeting as an observer, and was accepted as a Candidate RTC.

405 She further noted that during the inter-sessional period 30 training activities were organised by, or supported by OTGA. She further informed the Committee that a total of twenty-seven (27) new training courses were uploaded on the OT e-LP, in 4 different languages (English, French, Spanish and Portuguese). Meanwhile, the OT website and OT e-LP were completely redesigned, as well as the application process, which is now fully online.

406 She informed the Committee about the workplan agreed upon by the OTGA SG until December 2017.

407 She further informed that given the extra workload under the new OTGA structure, Mr Greg Reed was hired as a consultant and tasked to develop new training resources on Ocean Data Management as well starting the process towards a Quality Management Framework for OTGA.

408 She recalled that the OTGA is an extra budgetary Project funded by FUST (Government of Flanders, Kingdom of Belgium) ending in December 2018.

409 Mr Ariel Troisi (Argentina), informed that the RTC in Colombia is very important for the LAC Region. He underlined that IOC is getting attention by the UN for its efforts on Capacity Development, OTGA being one key element. He added that IODE plays a backbone role for IOC in terms of Capacity Development.

410 Dr Hernan Garcia (USA) congratulated IODE for the implementation of the OTGA RTCs. He informed that OTGA training courses will never be enough to reach everyone and suggested developing course(s) that can be used at university level. Ms Claudia Delgado informed that, under the framework of the IOC CD Strategy, such (OTGA) modules can be included in University curricula, and that efforts are being made to get universities to include (data and information management) course modules in their curricula.

411 Dr Somkiat Khokiattiwong (Thailand) congratulated the OTGA Project's achievements and suggested considering its renewal. In this context, he drew the attention to the existing ODINs in each region and recommended these should work closer together with OTGA.

412 Dr Yong Yao (China) informed that China is doing its utmost to establish the joint RTC in China composed of NCOSM and NMDIS (now under candidate RTC status). He informed that China would like to combine two main training tasks under its joint RTC, which is also JCOMM RMIC; this would further bond IODE and JCOMM. He further informed that the RTCs are at the service of the ODINs.

413 Mr Eduardo Klein, Co-Chair of SG-OBIS thanked the OTGA Project for supporting OBIS training activities. He extended his gratitude to the Government of Flanders, Kingdom of Belgium for the support provided. He further referred to the CBD/COP13/12 decision to partner with IODE/OBIS in training.

414 Dr Charles Sun (GTSPP) commented on the copyright and OTGA and suggested that all course materials available on the OceanTeacher e-Learning Platform should be copyright free.

415 **The Committee expressed** its great appreciation for the work carried out by the OceanTeacher Global Academy (OTGA) project, and in particular for the establishment of the OTGA Regional Training Centres (RTCs) which are expected to substantially increase data and information management capacity in IOC Member States and allow training at the regional level, using relevant languages and reach a higher number of learners.

416 **The Committee expressed** its great appreciation to the Government of Flanders (Kingdom of Belgium) for the financial support provided to the OceanTeacher Global Academy Project and invited the Government of Flanders (Kingdom of Belgium) to continue its support beyond 2018.

417 **The Committee instructed** the IODE Steering Group for the OceanTeacher Global Academy to draft, by March 2018, a project proposal for a follow up phase of the project, for submission to suitable donors.

418 **The Committee instructed** the IODE Steering Group for the OceanTeacher Global Academy to compile the necessary documentation on requirements to become a certified "Learning Services Provider" (LSP) under the ISO 29990 standard, which includes the type of training provided by IODE/OTGA, i.e. non-formal education and training.

4.2.2 Other IODE Capacity Development activities

419 This agenda item was introduced by Dr Claudia Delgado. She referred to **Document IOC/IODE-XXIV/4.2.2**.(***Report on other/new IODE Capacity Development Activities and Opportunities***).

420 Dr Delgado recalled that IODE has built a comprehensive Learning Management System (OceanTeacher) that, in combination with classroom training, has trained nearly 2000 students from 120 countries since 2005. This success demonstrates the expertise

within IODE and its potential to expand the use of this methodology to other IOC programmes.

421 She informed the Committee that the OTGA Project is able to complement other existing training programmes of the IOC and make the OceanTeacher e-Learning Platform widely available, thus benefiting all IOC Member States with special emphasis on developing regions.

422 The regional implementation methodology will allow the training programmes to become self-driven with great attention to local requirements, language and culture. Equally substantial attention is given to local ownership as the Regional Training Centres (RTCs), supported by the host countries. In addition, the OceanTeacher Global Academy validates the expertise available in developing regions and promotes their self-reliance in terms of specialized technical training and higher education related to ocean science, observation and data/information management.

423 She informed the Committee that during the inter-sessional period sixteen (16) training activities and workshops were jointly organized with other IOC Programmes and/or other external/partner organisations. Support consisted mostly, although not exclusively, on hosting training resources on the OT e-Learning Platform. She informed the Committee that this support is provided without extra financial support.

424 The first "Regional Training Course for Pacific Small Island Developing States on the Conduct of Marine Scientific Research under the United Nations Convention on the Law of the Sea" was organized jointly by IOC and the UN Division for Ocean Affairs and the Law of the Sea (DOALOS) in partnership with the Pacific Community (SPC) European Union supported Deep Sea Minerals Project and the Korea Maritime Institute (KMI) in Busan, Republic of Korea, in December 2015. IODE provided instruction on the assessment and management of data and sharing of data. The second Regional training course is planned for 2017 for Caribbean Small Island Developing States.

425 She further informed the Committee about activities planned for 2017-18.

426 The JCOMM Co-President, Dr Nadia Pinardi, expressed JCOMM's desire to work closely with OTGA for training within the framework of JCOMM and suggested the development of joint proposals in this regard.

427 **The Committee called** for closer collaboration with operational oceanography programmes and JCOMM, and to develop related training curricula and activities.

428 **The Committee strongly welcomed** the use of the OceanTeacher Global Academy by other IOC programmes as well as other organizations collaborating with IOC as a demonstration of the growing appreciation for IODE's training system.

429 **The Committee urged** its members to recommend or continue recommending the use of OceanTeacher Global Academy for training activities required by other projects in which they may be involved.

4.2.2.1 UNCLOS/BBNJ

430 This agenda item was introduced by Mr Ariel Troisi.

431 The United Nations General Assembly (UNGA resolution 69/292 on 19 June 2015) established a Preparatory Committee (PrepCom) on the development of a new legally-binding instrument under the UN Convention on the Law of the Sea to conserve and sustainably use marine biodiversity of areas beyond national jurisdiction (BBNJ).

432 The 49th IOC Executive Council (June 2016) established an Intersessional Working Group (IWG) on the IOC relevant issues related to the PrepCom with the tasks to examine the possible contribution of the IOC in relation to BBNJ, particularly in areas related to marine scientific research, capacity development and transfer of marine technology, as well as data

and information management, with a view to informing the participation of the IOC representative in the BBNJ process. The IWG has representatives from 25 Member States.

433 There is general agreement in the IWG that data management and data exchange constitute one of the areas of IOC's potential contribution to BBNJ. IODE and OBIS are regarded to be uniquely positioned to provide expertise in data curation, data integration, standards and open and free access to data, information, data products and services. It is also pointed out that capacity development on data standards, metadata and best practices is of great importance. Nevertheless, there is a call for a seamless query of associated data from other global repositories.

434 The creation of new mechanisms or structures with similar functions and roles should be avoided. However, some IWG members pointed out that both IODE and OBIS would require additional resources both in terms of financial and human. In addition, as for areas or topics for improvement, the IWG raises the need to improve the awareness of IODE and OBIS work, services and potential, as well as a widespread promotion to encourage submission of data to existing repositories. Some Member States indicated that interaction with user communities should be pursued, while others indicated the importance of capacity development.

435 The IODE Steering Group for OBIS also discussed the potential role of OBIS in BBNJ and concluded that OBIS could provide foundational technology and methodology for robust data integration, products, and services, and in fundamentally being a science mission can serve as a neutral party with regard to laws and regulations. However, while OBIS already provides much of the capability that a BBNJ data system can use, there are several areas that would require supplemental funding to focus on BBNJ-specific needs. The OBIS network, both applicable nodes providing data from areas beyond national jurisdiction and the international OBIS secretariat, will need to be further expanded with new resources to address the specific requirements for using OBIS in a legal instrument context. Increased scrutiny needs to be applied to flag data appropriate or inappropriate for specific uses in consultation with legal experts and communicate uncertainty in ways consumable by non-scientist users. In addition, support for developing training packages and for organizing training workshops will also be needed. The SG-OBIS identified that the OBIS secretariat will require up to 3 extra staff members for coordination, training and product development as well as funding to assist the deep-sea and other key OBIS Nodes through a targeted funding program.

436 Dr Somkiat Khokiattiwong (Thailand) expressed his appreciation for OBIS achievements and encouraged IOC to get strong participation from IOC's regional bodies to contribute to and supporting the BBNJ process.

437 Mr Eduardo Klein (OBIS SG Co-Chair) explained that OBIS works with data, which is provided by researchers and their institutes. The OBIS Secretariat is in charge of integrating all data in one single system and making it is accessible to all, and as such OBIS relies on the national data centres and regional nodes. He added that OBIS acknowledges the existence of many data gaps, especially in ABNJ, and encourages the Member States to support their national and regional OBIS nodes.

438 Mr Ariel Troisi (Argentina) added that during the BBNJ PrepCom meetings the data gaps on the Areas Beyond National Jurisdiction (ABNJ) became obvious. He urged the OBIS nodes to start considering data also for the ABNJ.

439 **The Committee expressed** its great appreciation to OBIS for bringing IODE to the attention of the United Nations General Assembly, promoting the importance of professional ocean data and information management and exchange.

440 **The Committee** called on its members to inform their national UN representatives of IODE and its OBIS to ensure better awareness and support.

441 **The Committee, noting** that most OBIS nodes operate on minimal resources, **called on Member States** to actively support their OBIS nodes to ensure they can provide the necessary data that are required by BBNJ**.**

442 **The Committee encouraged** IOC Member States to continue assisting in the support of the contributing national, regional and thematic OBIS nodes, which they host, that contribute data, technical infrastructure and scientific expertise that can support the BBNJ and other relevant international processes.

5. IODE COMMUNICATION AND OUTREACH

5.1 REPORTS ON COMMUNICATION AND OUTREACH ACTIVITIES DURING THE PAST INTER-SESSIONAL PERIOD

443 This agenda item was introduced by Prof Yutaka Michida, Co-Chair. He invited the Committee to report on communication and outreach activities they organized during the inter-sessional period with the objective of promoting IODE and its activities.

444 No information was received from Member States.

5.2 IOC COMMUNICATION AND OUTREACH STRATEGY FOR DATA AND INFORMATION MANAGEMENT: SEE 6.3

6. THE FUTURE OF IODE

445 This agenda item was briefly introduced by Ms Cyndy Chandler, Co-Chair.

6.1 REPORT OF THE INTER-SESSIONAL WORKING GROUP TO PROPOSE A RE-STRUCTURING OF IODE

446 This agenda item was introduced by Dr Hernan Garcia, Chair of the group. He referred to **Document IOC/IODE-XXIV/6.1**.(***Report of the inter-sessional working group to propose a re-structuring of IODE (Decision IODE-XXIII.1)).***

447 Dr Garcia recalled that at IODE-XXIII (agenda item 6.2.1: review of current projects and agenda item 3.3: project reports) the Committee had recommended to consider whether the current large number of projects, both global and regional, could continue to be coordinated by IODE national experts and the IODE Secretariat. While extensive discussions had been held at the Session on reduction of the number of projects, the Committee had not been able to reach a consensus on restructuring of IODE and had decided that the matter needed further study. Accordingly, through Decision IODE-XXIII.1 the Committee had established an inter-sessional working group to examine options for enhancing and possibly restructuring IODE to achieve an efficient and optimal use of human and financial resources and better communications of IODE activities to our partners and stakeholders. The Group had been given the following objectives: (i) Review the recommendations listed in Document IOC/IODE-XXIII/5b (The Future of IODE – Recommendations); (ii) Review the terms of reference for the IODE structure, projects, and activities to ensure continued relevance to IODE and IOC goals; (iii) Identify and evaluate the benefits IODE derives from the current structure, projects and activities; (iv) Evaluate any weaknesses of the current IODE structure, projects and activities and formulate ways to remedy these weaknesses; (v) Propose options for revising the current structure, projects and activities. The group was requested to work by email and to submit its document by December 2016. Its membership included 21 experts

from 19 Member States and was Chaired by Dr Hernan Garcia (USA, replacing Dr Margarita Gregg) and Prof Yutaka Michida (Japan).

448 Dr Garcia informed the Committee that the document produced by the inter-sessional working group provides proposals accompanied by success metrics, implementation plan, and risk-benefit considerations responsive to the evolving needs of the IODE ocean data and information community.

449 The document recommends (a) instituting a peer-reviewed and merit-based funding cycle process for IODE projects and activities and (b) establishing a new IODE Management Group representing the broad IODE data and information objectives to recommend, to execute, and to track approved IODE committee work plans.

450 The document further recommends that IODE should focus on relevant and doable strategies that lend themselves to achieving incremental and tangible progress over the next intersessional periods. It also recommends that IOC/IODE provides recognition to the IODE individuals that provide their time voluntarily to help implement IODE work plans with the consent of their host institutions.

451 In addition, the document provides strategic plan suggestions for the attention of the IODE Inter-sessional working group to revise the IOC Strategic Plan for Oceanographic Data and Information Exchange (Decision IODE-XXIII.2).

452 The Committee provided suggestions to improve the document and draft recommendations.

453 Regarding the selection of the expert on data management and the expert on marine information management there was some confusion which was resolved in the revised recommendation.

454 Dr Aidy Muslim, Co-Chair of the IODE Steering Group for the OceanTeacher Global Academy recommended to add a Co-Chair of the SG-OTGA to the membership of the IODE Management Group in order to ensure efficient coordination between IODE projects and IODE capacity development.

455 **The Committee expressed** its appreciation to the members of the inter-sessional working group in general, and to the Chair of the Group, Mr Hernan Garcia in particular, for the significant work achieved during the past two years.

456 **The Committee adopted** Decision IODE-XXIV.2 (THE IODE MANAGEMENT STRUCTURE)

457 **The Committee adopted** Decision IODE-XXIV.3 (IODE PROJECT AND ACTIVITY PERFORMANCE EVALUATION)

458 **The Committee noted** that the restructuring of IODE is an opportunity to maximize efficiencies by grouping similar projects and requested the IODE management group to look into this matter. In this regard reference was made to agenda item 3.4.7

459 **The Committee** decided that the relation between projects (eg data flow) should be better communicated within the IODE community but also to the user communities.

460 While the IODE-MG members provide their time voluntarily to these activities with the consent of their host institutions, it is highly recommended that IODE recognize their individual contributions and those of their host institution. This can be in the form of a thank you letter to the leadership of the IODE-MG member host institutions as well as to the individual member. It is important to recognize the time and effort that these individuals will provide on behalf of IODE.

461 **The Committee recommended** that a Letter, thanking the members of the IODE-MG for their contribution, is signed by the IOC Executive Secretary and sent every two years, a few months prior to the IODE Committee Session.

6.1.1 New IODE structural elements: Associate Information Units (AIU)

462 This agenda item was introduced by Ms Linda Pikula. She recalled the success of the Associate Data Units and pointed out the synergy in implementing a complementary structure of Associate Information Units. She noted the IODE lack of channels of direct communication with individual marine science libraries and information centres leading to minimal engagement with the marine information community. She further highlighted the mutual benefits to both IODE and the proposed AIUs of this new IODE structural element. In order to improve participation in MIM activities it was requested to clearly define "marine information management" in the Recommendation.

463 **The Committee adopted** Recommendation IODE-XXIV.5 (IODE ASSOCIATE INFORMATION UNIT (AIU))

6.2 REPORT OF THE INTER-SESSIONAL WORKING GROUP TO REVISE THE IOC STRATEGIC PLAN FOR DATA AND INFORMATION MANAGEMENT

464 This agenda item was introduced by Dr Lesley Rickards, Co-Chair of the group. She referred to **Document IOC/IODE-XXIV/6.2 *(IOC Strategic Plan for Data and Information Management)***. She recalled that IODE-XXII submitted a Draft Decision for the 27th Session of the IOC Assembly (June 2013), which was adopted. Subsequently the IOC Strategic Plan for Oceanographic Data and Information Management (2013-2016) was published as IOC Manuals and Guides No. 66. IODE XXIII established an inter-sessional working group to update this Strategic Plan.

465 The vision is to achieve "A comprehensive and integrated ocean data and information system, serving the broad and diverse needs of IOC Member States, for both routine and scientific use." The Strategic Plan has been developed to support the IOC Vision and High-Level Objectives for 2014–2021 (IOC Medium-Term Strategy).

466 The concept of delivering a data and information service for the "global ocean commons" (i.e. global public good) is central to this vision. The objectives of the Strategic Plan are to:

(i) Facilitate and promote the exchange of oceanographic data and information in compliance with the IOC Oceanographic Data Exchange Policy;
(ii) Deliver a comprehensive distributed data system that can receive data collected by all IOC programmes and projects and deliver them in a uniform and transparent way to all users;
(iii) Deliver a system that can collect bibliographic and factual information from all IOC programmes and projects and deliver them in a uniform and transparent way to all users;
(iv) Ensure alignment with, and contribution to, both the IOC's Medium Term Strategy for 2014-2021, and with the UN's 2030 Agenda for sustainable development, in particular the dedicated sustainable development goal for the ocean (Conserve and sustainably use the oceans, seas and marine resources for sustainable development).

467 The IOC Data and Information Management System resulting from this strategy will deliver:

(i) Assembled, quality controlled and archived data on a diverse range of variables according to scientifically sound and well-documented standards and formats;
(ii) Timely dissemination of data on a diverse range of variables (observations and model outputs) both on real-time and delayed modes depending on the needs of user groups and their technical capabilities (automatic dissemination as well as "on demand");

(iii) Easy discovery and access to data and information on a diverse range of variables and derived products (including forecasts, alerts and warnings) by users who have a broad range of capabilities.

468 Five expected outputs are identified in the Strategic Plan that aim to strengthen existing data and information systems:

(i) Improved ability to integrate regional and global data systems.
(ii) Improved capability and functionality of systems in the centres managing oceanographic data and information.
(iii) Promote free and open access to oceanographic data and information and adherence to IOC Oceanographic Data Exchange policy.
(iv) Address the needs of both the scientific users and society at large for the demand for access to quality data and information.
(v) Strengthen capacity to manage oceanographic data and information.

469 These five outputs will be achieved through targeted activities and related actions.

470 The implementation of the Strategic Plan will be the responsibility of the IOC Strategic Plan for Data and Information Management Advisory Group.

471 **The Committee approved** the draft decision for the 29th Session of the IOC Assembly entitled "IOC STRATEGIC PLAN FOR DATA AND INFORMATION MANAGEMENT (2017-2021)"

6.2.1 Follow-up to the audit of the IOC

472 This agenda item was introduced by Mr Tobias Spears, ODP project manager, referring to Document IOC/IODE-XXIV/6.2.1(***Ocean Data and Information System-Concept Paper***). He informed the Committee that a team of three auditors conducted an audit of the Intergovernmental Oceanographic Commission (IOC) from 11 to 24 April 2016. Samples of the accounts and documentation of the IOC were examined and open interviews were conducted with the senior staff members of the Commission and several representatives of Member States.

473 The audit resulted in 15 recommendations, which would be submitted to the IOC Assembly in June for further action (and to UNESCO). Recommendation 15 relates to IODE: "***The External Auditor recommends that a draft resolution be submitted to the IOC Assembly calling for Member States to work together, with the support of IOC, to construct a universal information system and ocean data portal, along with a cost-benefit analysis prepared in advance by the IODE project***. "

474 The recommendation had been drafted based upon the following elements:

475 (i) There is no common database for all marine sciences, which is certainly unattainable when one considers the amount, complexity and heterogeneity of the information to be assembled, but there is also no common portal for all marine sciences that connects all websites and relevant disciplines through web links

476 (ii) This array of data and information reflects the diversity of the stakeholders, the complexity of the subjects, the variety of material and the obsolescence of several systems. For its users, it appears to be part of the avowed landscape of marine science. For the outside observer, it seems to be the product of historical, technical, organizational, and disciplinary build-up, rather than the result of rational construction. This is even more evident as programmes like the International Oceanographic Data and Information Exchange (IODE) have existed for more than 50 years, with the express goal of encouraging the exchange of data, at least of metadata, between the different counterparts of oceanographic disciplines.

477 (iii) Naturally, the diversity of subjects (physics, chemistry, biology, climate, ecosystems, health, etc.) and the disparity of the information technology used are also

obstacles to putting them in perspective. Similarly, geostrategic and legal considerations may also be obstacles to pooling these systems. Lastly, typical sociological obstacles to information sharing or frequently used methods are also probably responsible. It remains the case that – at a time when the Member States, United Nations bodies, and various stakeholders in the fight against climate change and environmental conservation expect reliable, universal and up-to-date information from marine science – this wide variety of data and information systems seems outdated.

478 (iv) This dispersal of systems has naturally drawn the attention of some of its Member States. Thus, a Russian initiative, led by the All-Russian Research Institute Hydrometeorological Information at Obninsk, aims to develop an ocean data portal. For its part, the European Union has launched a marine data research project. Finally, the United States of America has a longstanding commitment to collect historic ocean data. In all three cases, the involvement of IOC is unclear and these initiatives seem to be in competition with each other rather than coordinated.

479 (v) This state of affairs goes beyond the scope of this audit, but we cannot help thinking that the Commission would perform its role well if its Assembly adopted a resolution promoting the construction of a universal information system and ocean data portal, taking into account current environmental, climate-related and sustainable development issues. Such an undertaking would increase the renown and visibility of IOC.

480 (vi) It could be useful to approach businesses that sell data to firms in need of information on the ocean (oil companies, ship owners, fisheries, etc.) to potentially receive sponsorship from such firms for the development of a common portal on all ocean-related matters.

481 The auditors have clearly identified the lack of coordination between various regional and international initiatives that relate to the development of a “global oceanographic data portal” and while this coordination clearly fits within the remit of IOC and its IODE, reality is different.

482 Mr Spears with contributions by Ms Pauline Simpson, Ms Cyndy Chandler, Prof Yutaka Michida and Mr Peter Pissierssens had subsequently prepared the above-mentioned working document. This paper describes a recommended strategy to move towards the implementation of a universal marine data and information system in response to the 2016 external audit of the IOC and its activities. After considering the observations presented in the audit, identifying the root causes which have contributed to the current state of the marine data and information systems landscape, **it is recommended that the IOC work with existing stakeholders, linked and not linked to the IOC, to improve the accessibility and interoperability of existing data and information, and to contribute to the development of a global ocean data and information system, to be referred to as the Ocean Data and Information System**, leveraging established solutions.

483 **The Committee stressed** that the proposed system would take into account, and build upon the work of the JCOMM/IODE ETDMP and the IODE Ocean Data Portal.

484 The JCOMM Co-President, Dr Nadia Pinardi, welcomed the proposed system which would be very useful to interact with the WIS system that allows to streamline protocols for data access. A federated system will be of great use and importance to JCOMM.

485 **The Committee adopted** Decision IODE-XXIV.4 (IODE OCEAN DATA AND INFORMATION SYSTEM)

6.3 REPORT OF THE INTER-SESSIONAL WORKING GROUP TO CREATE AN IOC COMMUNICATION AND OUTREACH STRATEGY FOR DATA AND INFORMATION MANAGEMENT

486 This agenda item was introduced by Ms Pauline Simpson, Co-Chair of the group. She

referred to **Document IOC/IODE-XXIV/6.3**. She recalled that the main task of the Inter-Sessional Working Group was to create an IOC Communication and Outreach Strategy for Data and Information Management whose objective is better communication of IODE activities to partners and stakeholders by defining a robust framework for communication and outreach activities, placing the global and regional presence of IODE at the forefront of coastal and marine knowledge management. (Decision IODE-XXIII.3 http://www.iode.org/index.php?option=com_content&view=article&id=289&Itemid=100017#decision23.3)

487 She reported that from May 2015 she has produced incremental drafts which have been circulated to a small review group: Sissy Iona; Greg Reed. She noted that the Communication Strategy implementation plan is organic and will need to be reviewed/evaluated at each IODE Committee session. She reminded the Committee of the IOC Communication Advisory Report 2016 and the advantages for IODE to work with the IOC digital communication activities.

488 Due to the small review group Ms Simpson had requested that a Sessional working group to review the IODE Communication Strategy be created. Any comments/edits from this SWG had been incorporated in the final draft for approval.

489 **The Committee thanked** the author of the document for the considerable work achieved.

490 **The Committee approved** the draft decision for the 29th Session of the IOC Assembly entitled "IOC (IODE) Communication and Outreach Strategy for Data and Information Management".

7. INTRODUCTION TO WORK PLAN AND BUDGET (FINANCIAL RESOURCES 2017-2019)

7.1 UNESCO REGULAR PROGRAMME FINANCIAL RESOURCES REMAINING FOR 2017 AND EXPECTED FOR THE BIENNIUM 2018-2019

491 This agenda item was introduced by Mr Peter Pissierssens. He informed the Committee that the 2016-2017 (38 C/5) UNESCO regular programme budget provided funding to IODE through 3 expected results (ER):

(i) ER 4: Scientific understanding of ocean and coastal processes bolstered and used by Member States to improve the management of the human relationship with the ocean:

(ii) ER 5: Risks and impacts of tsunamis and other ocean-related hazards reduced, climate change adaptation and mitigation measures taken, and policies for healthy ocean ecosystems developed and implemented by Member States

(iii) ER 6: Member States' institutional capacities reinforced to protect and sustainably manage ocean and coastal resources

492 This resulted in three budgetary allocations:

	2016	2017	Total
IODE & OBIS core systems:	47,565	47,565	95,130
IODE & OBIS products and services	21,953	21,952	43,905
IODE & OBIS training and education	45,000	45,000	90,000
Totals	114,518	114,517	229,035

493 It was noted however that funds were already spent on preparation for IODE and on-going commitments. Accordingly, Mr Pissierssens reported that the funds remaining available for 2017 (April-December) from the UNESCO RP would be around US$ 75,000

(three allocations combined)

494 For the next biennium (2018-2019) the exact allocations were not yet known but it was expected that some cuts would be made, possibly reducing the total allocation by 10% (probably approx. $103,500 if the $518M scenario is adopted). Mr Pissierssens recommended that the sessional working group on work plan and budget should take into account the expected cuts when preparing the draft work plan and budget for the next inter-sessional period.

7.2 EXTRA-BUDGETARY RESOURCES REMAINING FOR 2017 AND EXPECTED FOR THE BIENNIUM 2018-2019

495 This agenda item was introduced by Mr Peter Pissierssens. He informed the Committee that the following extra-budgetary projects were currently on-going:

Project Title	Funding source	Starting date	Ending date	Allocation 2017	Allocation 2018	Allocation 2019
OceanTeacher Global Academy	Flanders	May 2014	December 2018	829,000	829,000	0
Caribbean Marine Atlas Phase 2	Flanders	May 2014	December 2018	239,000	253,000	0
DIPS-4	Flanders	May 2014	December 2017	228,500	0	0
ECOPOTENTIAL	European Commission	June 2015	May 2019	154,300	154,300	0
SeaDataCloud	European Commission (via IFREMER)	November 2016	October 2020	20,000 at the contract signature 20,000 at the 1st anniversary of the project start date	20,000	20,000

496 He noted that, in addition to the above-mentioned project funds, the IOC Project Office for IODE would continue to receive a direct financial contribution funding from the Government of Flanders: €160,000/year between 2017 and 2020. He noted that due to expenses related to IODE-XXIV and on-going commitments the funds available for 2017 were expected to be around US$ 125,000. He further informed the Committee that the Flanders Marine Institute is mandated to renegotiate the terms of a collaborative MoU that should allow, in the context of the IOC Capacity development strategy and the roll-out of RTCs in the context of Ocean Teacher Global Academy, a gradually enhanced emphasis on an organising, in Ostend, activities that address training needs of a more European audience

497 The Flanders Marine Institute (VLIZ) had now attached the condition that the Flanders funds could be used only for meetings and training events organized in Oostende (with special attention to the benefit to Europe) and could no longer be used for other purposes.

498 He mentioned that, in addition to funding provided directly to IODE, IODE is also involved in a few additional activities or projects such as SPINCAM-III and LME:Learn. While these projects do not provide direct funding to IODE, IODE is recognized as a partner contributing to these projects. Reference was made in this regard to agenda item 3.5.2.2.

499 Mr Pissierssens recommended that the sessional working group on work plan and budget should consider the expected cuts when preparing the draft work plan and budget for the next inter-sessional period.

7.3 IODE HUMAN RESOURCES

7.3.1 UNESCO Regular Programme, Extra-budgetary and seconded staff

500 This agenda item was introduced by Mr Peter Pissierssens. He informed the

Committee that the staffing of the IOC Project Office for IODE had been further increased during the past inter-sessional period and now included:

(i) Mr Peter Pissierssens, Head of Office (UNESCO position – P-5)
(ii) Mr Ward Appeltans, OBIS Project Manager (UNESCO position – P-3
(iii) Mr Aditya Naik Kakodkar, Software developer/project manager (Project Appointment – P-2)
(iv) Mr Pieter Provoost, Database Manager (Project Appointment – P-2)
(v) Mr Mithun Gawas, Software developer (Project Appointment, P-1)
(vi) Ms Claudia Delgado, Training Coordinator (Seconded by VLIZ)
(vii) Ms Kristin de Lichtervelde, Administrative manager (Seconded by VLIZ)
(viii) Mr Mark Van Crombrugge, IT manager (Seconded by VLIZ)
(ix) Ms Lies Groen, Office assistant (Contracted through VLIZ, ½ time)

501 An additional "data science officer" was being recruited for OBIS (project appointment, P-1) and was expected to join the Project Office in April 2017. An additional administrative assistant was also being recruited (G-3) around March 2017. This would bring the total staff number of 11.

502 Mr Pissierssens noted that, while the number of staff has further increased during the past inter-sessional period, all additional staff were funded through projects, all of which would end in 2018. In order to maintain these positions new projects would therefore need to be drafted and funding identified by the end of 2018. Taking into account the deteriorating financial situation of UNESCO it was highly unlikely that additional UNESCO regular programme positions could be established during the next UNESCO biennium 2018-2019.

7.3.2 Internships

503 This agenda item was introduced by Mr Peter Pissierssens. He reported that one internship had been provided during the inter-sessional period 2015-2017: Ms Sayaka Suda was seconded to the Project Office for a period of 3 months (November 2016- February 2017) by Japan (University of Tokyo) to assist with the population of the IOC capacity development web site.

504 **The Committee thanked** Japan for the secondment of an intern.

7.4 OTHER RESOURCE OPPORTUNITIES FOR 2017-2019

505 This agenda item was introduced by Ms Cyndy Chandler. She invited the Committee to report or propose other resource opportunities for the next inter-sessional period.

506 None reported

8. PROPOSED WORK PLAN FOR THE NEXT INTER-SESSIONAL PERIOD (2017-2019)

8.1 CURRENT PROJECTS

507 This agenda item was introduced by Mr Greg Reed, Chair of the sessional work group on work plan and budget. He referred to **Document IOC/IODE-XXIV/8.1** which had been prepared by the Secretariat prior to the Session and based upon the current project reports as well as new proposals submitted during the Session.

508 Mr Reed recalled that the funding for IODE comes mainly from two sources: the UNESCO regular programme and the funds from the Government of Flanders. He recalled further that the funds from Flanders should be used only for activities carried out in

Oostende.

509 **The Committee adopted** Recommendation IODE-XXIV.6 (IODE WORK PLAN AND BUDGET FOR 2017-2019).

8.2 NEW INITIATIVES

510 This agenda item was introduced by Mr Greg Reed, Chair of the sessional work group on work plan and budget.

511 There was one additional request for a ODINCINDIO training event (submitted by the Islamic Republic of Iran) and a budget allocation was added for this purpose. No other new initiatives were included in the budget.

9. ANY OTHER BUSINESS

512 This agenda item was introduced by Prof Yutaka Michida, Co-Chair. He referred to items identified under agenda item 2.1

9.1 RESEARCH VESSEL CRUISE CATALOGUE SYSTEMS

513 This agenda item was introduced by Ms Cyndy Chandler, Co-Chair.

514 The Committee recalled that during the late 1960s IODE started the system of the National Oceanographic Programmes (NOPs) and Cruise Summary Reports (CSRs, formerly ROSCOPs) as a way to share information on planned research cruises as well as to report on the results of research cruises. For many years the NOP information was managed by the IODE Secretariat. However, at IODE-XV (1995) an offer was made by the University of Delaware to take on this task as part of OCEANIC (http://www.cms.udel.edu). The IODE Committee accepted this kind offer and Oceanic managed the service for well over ten years. At IODE-XVI, IODE decided to cease the mailing of paper copies of NOPs by the Secretariat, requested NODCs to mail NOPs directly to OCEANIC (http://www.researchvessels.org), and recommended that NOP information be made available on-line through OCEANIC. OCEANIC has continued this function, but has found it increasingly difficult to fund this activity in recent years.

515 More recently other similar services have been established. Some are national while others are regional or international, for example: (i) POGO's Ocean-going research vessel cruise programmes (http://www.pogo-oceancruises.org/content/content.asp?pageid=2) is global; (ii) the Rolling Deck to Repository Cruise Catalog (http://www.rvdata.us/search) covers the US academic fleet; and (iii) JCOMMOPS Cruises (http://www.jcommops.org) now hosts a cruise directory database as well.

516 While the same research vessel is included in several databases it is often unclear whether they are systematically covered or not.

517 The Committee was requested to consider identifying one or more "sources of choice" for research vessel information.

518 Mr Friedrich Nast (Germany) informed the Committee that the recent ODIP workshop discussed the problem of CSRs and cruise plans. ODIP had been successful in harmonizing Australian, USA and European systems using SDN standards. All systems were now using the same standards. He recommended for IODE to set up a service in the IODE web site where the three systems can be accessed jointly. This should not be difficult and can be done in cooperation with ODIP. The next ODIP workshop will be in the autumn of 2017. This would also be excellent opportunity for cooperation between IODE and ODIP.

519 **The Committee requested** the IODE Secretariat to coordinate with ODIP the establishment of a web page in the IODE web site to provide access to cruise tracks of

multiple systems.

520 Dr Lesley Rickards (UK) noted that distinction should be made between cruise programme and cruise summary reports because different organisations have different priorities: POGO is interested in programmes to share resources like vessels, while JCOMMOPS has similar interests (e.g. the deployment of Argo floats).

521 Mr Appeltans explained that in the context of UNCLOS/BBNJ, the issue of traceability and provenance of Marine Genetic Resources is discussed as a function of a data platform clearing house. A more federated, interoperable system for cruise information with unique persistent identifiers would benefit BBNJ and would allow the integration of cruise information with the actual sample data in OBIS. A proposal could be presented at the next BBNJ PrepCom meeting in July at the UN in NY.

522 Ms Chandler offered to make her slides on Cruise Summary Catalogues and the poster on Recommendations for Publishing Marine Research Cruise Metadata (based on the outcomes of the ODIP workshop) available to Ward should he wish to include them in his session at BBNJ PrepCom.

10. DATE AND PLACE OF THE NEXT SESSION

523 Ms Cyndy Chandler, IODE Co-Chair invited the Committee to discuss the date and venue of the twenty-fifth Session. The Committee was invited to consider holding the meeting during the month of March 2019, taking into consideration the need to report to the IOC Assembly in June 2019.

524 The Committee was further informed that, as result of terrorist attacks carried out in various regions around the world in 2015 and 2016, new security regulations had been adopted by the United Nations in August 2016. These made timely planning and preparations of meetings such as the IODE Committee Meeting essential. Countries that would be prepared to host the next Session were therefore kindly requested to inform the IODE Secretariat of their intention to host, not later than 12 months before the next Session dates, i.e. March 2018. Full information on the in-kind contributions expected from a Host were available upon request from the IODE Secretariat.

525 The delegate of Japan informed the Committee of their intention to send an invitation to host the 25th Session and that they would communicate with the Secretariat when the Government could confirm the invitation.

11. ELECTION OF THE CO-CHAIRS

526 The IODE Technical Secretary introduced this item by referring to the IOC Rules of Procedure (Document IOC/INF-1166), and more particularly to Rule 25, para 3. The Technical Secretary informed the Committee that, in accordance with the above Rules, the current two Co-Chairs (Ms Cyndy Chandler and Prof Yutaka Michida) had completed one term and could be invited to continue for a second term of two years.

527 **The Committee unanimously re-elected** Ms Cyndy Chandler and Prof Yutaka Michida as IODE Co-Chairs.

528 Prof Michida noted that they would strive to bring the re-structuring of IODE to a good end and to continue the promotion of free and open access to ocean data and information. Ms Chandler said it was an honour to represent this community and she looked forward to another two years.

12. ADOPTION OF THE SUMMARY REPORT

530 This Agenda Item was introduced by both Co-Chairs. The Committee was invited to adopt the draft Summary Report of the Session, and the Decisions and Recommendations.

531 The Committee requested its Co-Chairs and the IOC Secretariat to make editorial corrections as necessary, taking into account the discussions held during the session.

532 **The Committee requested** the IODE Co-Chairs to present the Executive Summary with all Resolutions and Recommendations therein to the Twenty-Ninth Session of the IOC Assembly that will take place between 19 and 30 June 2017 at the UNESCO headquarters in Paris, France.

13. CLOSING OF THE SESSION

533 The Session was closed at 17:05 on Friday 31 March 2017. Ms Chandler appreciated the time spent by all participants to prepare for the meeting. She further noted that as the Session duration had been reduced to three working days (excluding the day for adoption of the recommendations and report) time available was somewhat short.

534 She further thanked the Government of Malaysia and the local team for hosting, the excellent arrangements and for the hospitality. The also thanked the IODE Secretariat members for their support of the meeting.

535 Prof Michda echoed the words of Ms Chandler. He thanked all participants for the contributions to the work of the Committee. He stated that the Committee is now in challenging times and so we decided on a new management structure as well as a new way of starting and ending activities. He looked forward to presenting the outcome of the meeting to the upcoming IOC Assembly. He also expressed great gratitude to the local host for the excellent arrangement, and for Cyndy's leadership.

ANNEX I

AGENDA

1. **OPENING**

2. ADMINISTRATIVE ARRANGEMENTS

2.1. ADOPTION OF THE AGENDA
2.2. DESIGNATION OF A RAPPORTEUR
2.3. SESSION TIME TABLE AND DOCUMENTATION
2.4. ESTABLISHMENT OF SESSIONAL WORKING GROUPS
2.5. LOCAL ARRANGEMENTS

3. REPORT ON THE PAST INTER-SESSIONAL PERIOD (2015-2016)

3.1. PROGRESS REPORT ON THE IODE-XXIII WORK PLAN
3.2. REPORTS OF THE IODE GROUPS OF EXPERTS
- 3.2.1. JCOMM/IODE Expert Team on Data Management Practices (ETDMP)
- 3.2.2. IODE/IAMSLIC Group of Experts on Marine Information Management (GE-MIM)

3.3. STATUS OF THE IODE NETWORK
- 3.3.1. Renewal of the MoU between VLIZ and UNESCO/IOC on the IOC Project Office for iODE

3.4. PROGRESS REPORTS OF GLOBAL IODE PROJECTS
- 3.4.1. Ocean Biogeographic Information System (OBIS)
  - 3.4.1.1. OBIS-ENV-DATA Pilot Project
  - 3.4.1.2. Development of Information Products and Services for Ocean Assessments (DIPS-4 Ocean Assessments)
- 3.4.2. Global Oceanographic Data Archaeology and Rescue Project (GODAR)
- 3.4.3. World Ocean Database (WOD)
- 3.4.4. Global Temperature and Salinity Profile Programme (GTSPP)
- 3.4.5. Global Ocean Surface Underway Data Project (GOSUD)
- 3.4.6. International Coastal Atlas Network project (ICAN)
- 3.4.7. International Quality Controlled Database project (IQuOD)
- 3.4.8. IODE OceanDataPortal
- 3.4.9. IODE OceanDataPractices
- 3.4.10. IODE OceanDocs
- 3.4.11. IODE OceanExpert
- 3.4.12. IODE OceanKnowledge Platform Pilot Project
- 3.4.13. IODE OpenScienceDirectory
- 3.4.14 IODE Quality Management Framework project (QMF)

3.5. PROGRESS REPORTS OF JOINT ACTIVITIES WITH OTHER PARTNERS
- 3.5.1. JCOMM
  - 3.5.1.1. Ocean Data Standards and Best Practices (JCOMM/IODE)
- 3.5.2. IOC
  - 3.5.2.1. GOOS

3.5.2.1.1. GEO BON/ MBON
3.5.2.2. MPR
3.5.2.2.1. SPINCAM
3.5.2.2.2. LME:Learn
3.5.2.2.3 Sustainable Development Goals (SDG)
3.5.2.3. Ocean Science
3.5.2.3.1. GOSR
3.5.2.3.2. HAEDAT
3.5.2.3.3. IOC Working Group on IGMETS, TrendsPO, GO2NE
3.5.3. European Union projects
3.5.3.1. EMODNET
3.5.3.2. EOOS
3.5.3.3. SEADATACLOUD
3.5.3.4. ECOPOTENTIAL
3.5.4. ICSU World Data System (WDS)
3.5.5. Research Data Alliance (RDA)
3.5.6. 2nd International Indian Ocean Expedition (IIOE-2)
3.5.7. Research Coordination Network (RCN): Sustained Multidisciplinary Ocean Observations (RCN:OceanObsNetwork)
3.6. PROGRESS REPORTS OF REGIONAL ACTIVITIES
3.6.1. ODINAFRICA
3.6.2. ODINBLACKSEA
3.6.3. ODINCARSA-LA
3.6.3.1. Caribbean Marine Atlas (phases 1 and 2)
3.6.3.2. CLME+
3.6.4. ODINCINDIO
3.6.5. ODINECET
3.6.6. ODINWESTPAC
3.6.7. Other
3.6.7.1. IIOE-2: see 3.5.6

4. IODE CAPACITY DEVELOPMENT

4.1. THE IOC CAPACITY DEVELOPMENT STRATEGY AND ITS IMPLEMENTATION PLAN
4.2. IMPLEMENTATION OF THE IOC CAPACITY DEVELOPMENT STRATEGY BY IODE
4.2.1. Progress Report on the IODE OceanTeacher Global Academy project
4.2.2. Other IODE Capacity Development activities
4.2.2.1. UNCLOS/BBNJ

5. IODE COMMUNICATION AND OUTREACH

5.1. REPORTS ON COMMUNICATION AND OUTREACH ACTIVITIES DURING THE PAST INTER-SESSIONAL PERIOD
5.2. IOC COMMUNICATION AND OUTREACH STRATEGY FOR DATA AND INFORMATION MANAGEMENT: see 6.3

6. THE FUTURE OF IODE

6.1. REPORT OF THE INTER-SESSIONAL WORKING GROUP TO PROPOSE A RE-STRUCTURING OF IODE

6.1.1. New IODE structural elements (AIUs)
6.2. REPORT OF THE INTER-SESSIONAL WORKING GROUP TO REVISE THE IOC STRATEGIC PLAN FOR OCEANOGRAPHIC DATA AND INFORMATION MANAGEMENT
6.2.1. Follow-up to the audit of the IOC
6.3. REPORT OF THE INTER-SESSIONAL WORKING GROUP TO CREATE AN IOC COMMUNICATION AND OUTREACH STRATEGY FOR DATA AND INFORMATION MANAGEMENT

7. INTRODUCTION TO WORK PLAN AND BUDGET (FINANCIAL RESOURCES 2017-2019)

7.1. UNESCO REGULAR PROGRAMME FINANCIAL RESOURCES REMAINING FOR 2017 AND EXPECTED FOR THE BIENNIUM 2018-2019
7.2. EXTRA-BUDGETARY RESOURCES REMAINING FOR 2017 AND EXPECTED FOR THE BIENNIUM 2018-2019
7.3. IODE HUMAN RESOURCES
7.3.1. UNESCO Regular Programme, Extra-budgetary and seconded staff
7.3.2. Internships
7.4. OTHER RESOURCE OPPORTUNITIES FOR 2017-2019

8. **PROPOSED WORK PLAN FOR THE NEXT INTER-SESSIONAL PERIOD (2017-2019)**

8.1. CURRENT PROJECTS
8.2. NEW INITIATIVES

9. ANY OTHER BUSINESS

9.1. Research Vessel Cruise catalogue systems

10. DATE AND PLACE OF THE NEXT SESSION

11. ELECTION OF THE CO-CHAIRS

12. ADOPTION OF THE SUMMARY REPORT

13. CLOSURE OF THE SESSION

ANNEX II

DECISIONS AND RECOMMENDATIONS OF IODE-XXIII

Decision IODE-XXIV.1:	REVISION OF THE TERMS OF REFERENCE OF THE IODE QUALITY MANAGEMENT FRAMEWORK PROJECT TO ACCOMMODATE ADUs
Decision IODE-XXIV.2:	THE IODE MANAGEMENT STRUCTURE
Decision IODE-XXIV.3:	IODE PROJECT AND ACTIVITY PERFORMANCE EVALUATION
Decision IODE-XXIV.4:	OCEAN DATA AND INFORMATION SYSTEM
Recommendation IODE-XXIV.1:	REVISED TERMS OF REFERENCE OF THE JOINT IAMSLIC/IODE GROUP OF EXPERTS ON MARINE INFORMATION MANAGEMENT IN A TRANSITIONAL CAPACITY
Recommendation IODE-XXIV.2:	THE UNESCO/IOC PROJECT OFFICE FOR IODE IN OOSTENDE, BELGIUM
Recommendation IODE-XXIV.3:	ESTABLISHMENT OF THE IODE PILOT PROJECT OBIS EVENT DATA FOR SCIENTIFIC APPLICATIONS (OBIS-EVENT-DATA)
Recommendation IODE-XXIV.4:	ESTABLISHMENT OF THE OCEAN DATA AND INFORMATION NETWORK FOR THE WESTERN PACIFIC REGION (ODINWESTPAC) PROJECT
Recommendation IODE-XXIV.5 :	IODE ASSOCIATE INFORMATION UNIT (AIU)
Recommendation IODE-XXIV.6:	IODE WORK PLAN AND BUDGET FOR 2017-2019
Draft Decision of IOC-XXIX (agenda item 6.2.2):	IOC STRATEGIC PLAN FOR DATA AND INFORMATION MANAGEMENT (2017-2021)
Draft Decision of IOC-XXIX (agenda item 6.2.1)	IOC COMMUNICATION AND OUTREACH STRATEGY FOR DATA AND INFORMATION MANAGEMENT

Decision IODE-XXIV.1

REVISION OF THE TERMS OF REFERENCE OF THE IODE QUALITY MANAGEMENT FRAMEWORK PROJECT TO ACCOMMODATE ADUs

The IOC Committee on International Oceanographic Data and Information Exchange,

Noting the Recommendation IODE-XXII.18 (Establishment of the IODE Quality Management Framework Project) with the following objectives:

(i) provide the overall strategy, advice and guidance to NODCs to establish organizational quality management systems for the delivery of oceanographic and related data, products and services,
(ii) initiate and review existing standards and Manuals and Guides with respect to the inclusion of quality management procedures and practices,
(iii) apply the necessary capacity development activities to ensure accreditation of NODCs according to agreed criteria in order to bring all NODCs to a minimum agreed level,

Further noting that the number of Associate Data Units (ADU) is growing and ADUs are contributing data to NODCs and the OBIS portal as data providers, and the importance for ADUs to meet the IODE accreditation requirements,

Decides that ADUs can apply for accreditation under the IODE-QMF and those ADUs that meet the IODE accreditation requirements will be awarded the status of ***Accredited IODE Associate Data Unit***,

Instructs the SG-QMF to update the *IODE Quality Management Framework for National Oceanographic Data Centres*. (IOC Manuals and Guides 67) to include accreditation requirements for ADUs.

Encourages Member States to nominate experts having expertise in implementing quality management systems for management of oceanographic data to the SG-QMF,

Strongly encourages NODCs and ADUs to develop Quality Management Systems for their Centres and to apply for IODE accreditation,

Invites Member States with a well-developed QMS in place to share experiences, expertise and documentation with other Member States developing or planning such systems.

Decision IODE-XXIII.2

THE IODE MANAGEMENT STRUCTURE

The IOC Committee on International Oceanographic Data and Information Exchange,

Recalling decision IODE-XXIII.1 to establish an inter-sessional working group to examine options for enhancing and possibly restructuring IODE to achieve an efficient and optimal use of human and financial resources and better communications of IODE activities to our partners and stakeholders,

Recognizing the need for strong and active leadership of the IODE programme, as well as for active liaison between IODE and international scientific and operational marine programmes,

Taking into consideration the recommendation of the inter-sessional working group,

Decides to replace the IODE Officers with the **IODE Management Group** (IODE-MG) with the terms of reference described in Annex A.

Annex A to Decision IODE-XXIV.2
Terms of Reference of the IODE Management Group (IODE-MG)

Objectives

The IODE-MG will have the following terms of reference:

(i) Be responsible for reviewing progress of the work plan and budget approved by the IODE Committee and adjusting them as required,
(ii) Oversee the assessment of IODE projects and activities and recommend their endorsements when these meet the agreed evaluation criteria,
(iii) Evaluate for efficacy the existence of any existing IODE groups formed by the IODE Committee.

Membership

The membership of IODE-MG will comprise up to six members:

(i) The current two IODE Co-Chairs,
(ii) One expert on data management (IODE-DM),
(iii) One expert on information management (IODE-IM),
(iv) One or both past IODE Co-Chairs (to be agreed by past Co-chairs), and
(v) Head of the IODE Project Office (non-voting member).

The IODE-MG may seek the advice of subject matter experts, project chairs, and others as appropriate to help formulate its decisions and recommendations.

The IODE-MG will reach decisions by consensus of its voting members. IODE-MG members should not participate in decisions that relate to a project on which there may a perceived conflict of interest.

Term of IODE–MG members

- Co-chairs, elected by IODE Committee every two years for a two-year term, renewable once.
- Past Co-chairs – until new Co-chairs are elected.
- IODE-DM, IODE-IM members are nominated by IODE national coordinators, in consultation with NODCs, ADUs and AIUs, and the members should be associated with an IODE structural element. Nominations for IODE-DM and IODE-IM members are

reviewed and members selected by the MG, based on subject matter expertise and needs identified by the Committee in the workplan, IODE-DM, IODE-IM members will serve for a two-year term, renewable once.

Roles and responsibilities:

IODE Co-chairs

- Chair IODE sessions and inter-sessional meetings
- Manage the progress of IODE implementation
- Ensure timely and complete production of documentation for Committee Sessions
- Help communicate IODE-MG decisions in a timely manner to the community
- Represent IODE at meetings of relevance to IODE

IODE past Co-chair(s)

- Advise the IODE Co-chairs and the IODE-MG on IODE matters
- Provide continuity considering past experience
- Represent IODE at other fora as requested by the IODE-MG

Data Management (IODE-DM) member

- Advise the IODE-MG concerning overall IODE data management matters
- Represent IODE in JCOMM data management, as required
- Represent IODE on data management groups as requested by the IODE-MG considering resources (e.g. Ocean Observations Panel for Climate [OOPC], Global Ocean Observing System [GOOS])
- Represent IODE at other fora as the need arises
- Inform the IODE community on relevant data management activities
- Ensure liaison with IODE projects and activities (e.g. OBIS, WOD, GTSPP, etc.)

Information Management (IODE-IM) member

- Advise the IODE-MG concerning overall IODE information management matters
- Represent IODE on information management groups as requested by the IODE-MG considering resources (e.g. IAMSLIC, ASFA, etc.)
- Represent IODE at other fora as the need arises
- Inform the IODE community on relevant information management activities
- Ensure liaison to IODE projects and activities

Decision IODE-XXIV.3

IODE PROJECT AND ACTIVITY PERFORMANCE EVALUATION

The IOC Committee on International Oceanographic Data and Information Exchange,

Recalling decision IODE-XXIII.1 to establish an inter-sessional working group to examine options for enhancing and possibly restructuring IODE to achieve an efficient and optimal use of human and financial resources and better communications of IODE activities to our partners and stakeholders,

Noting the projects and activities approved for funding by the IODE Committee do not, in general, include performance indicators to monitor progress,

Further noting that currently IODE manages over thirty global and regional projects, some of which have been continuous for several years, and in some cases without clearly defined deliverables,

Acknowledging the urgent need to develop and implement a harmonized mechanism for deciding and reporting on IODE projects and activities,

Taking into consideration the recommendation of the inter-sessional working group,

Decides that proposals for all IODE projects and activities will follow a consistent process cycle, described in **Annex A, Annex B** and **Annex C**, which includes project and activity proposals using a template with relevant information, a merit-based proposal evaluation criteria, and a process for evaluating the performance of on-going projects and for endorsing or terminating projects based on metrics,

Instructs the IODE-MG to review existing projects and activities, based on the new proposal process, and organize the orderly implementation of projects and activities under the new system.

Annex A
Process for proposing projects and activities

Definitions

Within the context of IODE, the following definitions are used:

- **IODE Pilot Project:** An exploratory effort with limited duration (e.g., 1-2 years) requiring complete or partial direct IODE financial funding as well as project office management in-kind support. A pilot project cannot be extended/renewed: if successful then a proposal can be submitted for an IODE project.
- **IODE Project:** A temporary effort with limited duration (e.g., 1-2 years) requiring complete or partial direct IODE financial funding as well as project office management in-kind support. Projects can be renewed using a new proposal application process at the discretion of the IODE-MG.
- **IODE Activity**: A temporary effort with limited duration (e.g., 1-2 years extended as decided by the IODE-MG) requiring only IODE project office management in-kind support with defined objectives or purpose (no funding). Activities can be in the form of institutional endorsements that draw favourable attention to IODE as an organization, and help IODE to explain how it contributes to IOC objectives.
- **IODE persistent project**: a long-term effort (requiring complete or partial direct IODE financial funding as well as project office management in-kind support) or activity. Such

long-term efforts need to be reviewed by the IODE management group at the same frequency as other projects and activities. Current examples include OBIS, WOD, GTSPP, GOSUD, OceanDocs, OceanExpert, etc.

Anyone from the IODE community can propose activities and projects following the procedure outlined:

- The IODE Project Office will provide timely announcements, on the IODE web page and via email calling for project and activity proposals, from the IODE community,
- Guidelines will be provided describing the proposal submission process (guidelines, including estimate of available funds) to the IODE Project Office using a standard template,

Template

The template for all project and activity proposals will include the following and other aspects as feasible as decided by the IODE Management Group:

1. Proposed title of project or activity
2. Description of the alignment with IODE strategy and vision
3. The benefits to the IOC/IODE community
4. Proposed starting and end date (except for persistent projects)
5. Project leader, project team members
6. Budget (total budget, available resources, budget requested from IODE)
7. The project/activity plan
8. The goals and objectives
9. The timeline, milestones, and deliverables
10. How will the results be shared with the IOC/IODE community
11. Optional: Does the project or activity have endorsements or support from the IOC/IODE community or other national, regional, or international programmes (this can be added as appendices to the proposal)?
12. All proposals should be signed by the Project Leader and project team members.

Process

The process for proposals of projects and activities proposals will include the following and other aspects as feasible as decided by the IODE Management Group:

1. The IOC Project Office for IODE will check proposals for compliance with the proposal template. Proposals that do not comply will be returned to the submitter with a note explaining what is missing. Submitters have 10 working days to re-submit. Failure to re-submit within that period results will result in rejection of the proposal.
2. Re-submitted proposals are checked for compliance with the proposal template. Proposals that were re-submitted but still do not comply are rejected. The submitters will be informed of this by email.
3. All proposals that comply with the proposal template are sent to the IODE-MG by email, with a request to review and score the proposals, not later than a given deadline.
4. IODE-MG will review and evaluate proposals using the Proposal Evaluation Criteria (**Annex B**). IODE-MG may select a pool of independent or subject matter experts from the IODE community to provide peer-review comments regarding proposed project and activities.
5. The IODE Co-chairs will collect the evaluations for all proposals from all members of the IODE-MG, calculate the average score for each proposal, rank the proposals by their average score, and prepare a summary table according to descending scores including title, score and evaluation comments.
6. The IODE Co-chairs will send the summary table with the members of the Management Group requesting approval the summary table.
7. Members of the IODE-MG will review the summary table and inform the IODE Co-chairs of their approval. If one or more of the members disagrees then the IODE Co-chairs should be informed immediately so necessary correction(s) can be made.

8. The IODE Co-chairs will prepare a working document for the upcoming IODE Committee Session including the reviewed proposals, the summary table with scores and evaluation comments.
9. The IODE Co-chairs will submit the working document to the Head of the IOC Project Office for IODE, who will post the document on the web site for the upcoming IODE Committee Session. The outcome of the proposal review process will be made public in a timely manner.
10. Based upon the above deadlines the total process will require approximately 80 working days. Taking into account the deadline for submission of working documents this means that step 1 should start no later than 1 September of the year preceding the IODE Committee Session.

Annex B
Process for evaluating projects and activities proposals

The IODE-MG will use the following criteria to assess the fitness for purpose of a project proposal or activity within the context of IODE objectives. Each member of the evaluation panel will score the proposal with 4, 2, or 0 points based on their individual evaluation. Scores from all members will be added and a project must receive an average score of 60% or more to be considered for recommendation by the IODE-MG to the IODE committee.

Proposal evaluation criteria

The process for evaluation of all proposals will include the following and other aspects as feasible as decided by the IODE Management Group:

a. Does the project or activity target one or more IODE objectives? Are there strong arguments to justify this assertion?
   Score: 4. The arguments are strong and the support is clear,
   Score: 2. The projector activity appears to target one or more objectives, but arguments are weak,
   Score: 0. The project or activity does not seem to support an IODE objective or the arguments are unconvincing.
b. Are there tangible commitments from participating participants and countries?
   Score: 4. Commitments are clear and documented by letters of support
   Score: 2. Commitments are clear, but documentation is lacking
   Score: 0. Commitments are unclear or documentation is lacking
c. Do the project or activity deliverables enhance IODE activities?
   Score: 4. Deliverables are easily identified with IODE deliverables?
   Score: 2. Deliverables are clear but not easily connected to IODE deliverables
   Score: 0. Deliverables are unclear or do not connect to IODE deliverables
d. Is there strong support from IODE stakeholders for the deliverables of the project?
   Score: 4. Documented support from, or participation of stakeholders
   Score: 2. Some weakness in documented support or stakeholders are absent
   Score: 0. Support is not documented and stakeholders are absent
e. Are there clear performance metrics for the project?
   Score: 4. Metric are well explained and relevant to evaluating project against deliverables
   Score: 2. Some metrics are poorly explained and it is unclear how they can be used in evaluating performance
   Score: 0. Metrics are poorly defined or cannot be used to evaluate performance
f. Does the project need financial or other support from IODE to meet its objectives?
   Score: 4. No support is required
   Score: 2. Some non-financial support is desirable
   Score: 0. Full financial support is crucial to the project
g. Does the project or activity fill a gap in IODE activities?

Score: 4. The gap is well described as is how the project addresses it
Score: 2. The argument that there is a gap is not strong, or the project is now clear as to how the gap is addressed
Score: 0. Neither the argument of the gap, not the way the project addresses it is well presented

h. Is there a strong governance model for the project (e.g., plan is actionable and realistic)?
Score: 4. The model is well described and appears quite workable given the participants
Score: 2. The model is well described, but there is some doubt of its workability
Score: 0. The model is poor

i. Overall, how strong is the project or activity proposal?
Score: 4. Well described, and well received by many IODE members
Score: 2. Well described but has more limited member support
Score: 0. The proposal or activity did poorly in gaining IODE member support

Annex C
Process for evaluating projects and activities

IODE projects and activities will be evaluated once every year based on annual reports using an evaluation or performance criteria.

IODE-MG members may choose to serve on an evaluation panel, or nominate expert(s) to carry out the evaluation on their behalf. Once the evaluation is done, a concise, written report of results will be available to IODE members no later than two months after the annual reports are received. Annual project and activity reports with information required to evaluate degree of progress shall be submitted to the IODE-MG. No evaluation panel member may provide an evaluation of a project or activity in which they are involved.

IODE-MG will use the criteria below to evaluate project and activity performance as appropriate. Results of the evaluation will be anonymized and shared with proponents. Project and activity evaluations will be circulated to IODE members.

Performance evaluation criteria

The process for performance evaluation of all projects and activities will include the following and other aspects as feasible as decided by the IODE Management Group:

a. Are there annual reports?
Score: 4. Annual reports are produced each year and on time
Score: 2. There is a gap in annual reporting, or they are delivered later than expected,
Score: 0. Annual reporting is missing

b. Do the reports explain annual milestones and deliverables, and present measurable results of progress towards them?
Score: 4. Objectives are clear and mostly documented as achieved
Score: 2. Objectives are clear but documentation of achievements is weak
Score: 0. Objectives are poorly stated or achievements are unclear.

c. Are the project objectives still aligned with those of IODE?
Score: 4. Objectives are still well aligned
Score: 2. There is some misalignment that can be corrected
Score: 0. Objectives are misaligned with IODE objectives

d. Are participants in the proposal actively engaged based on documentation in the reports?
Score: 4. Reports document continuing active involvement by participants
Score: 2. Reports appear to show some fall off in participant involvement
Score: 0. Involvement by members is greatly reduced.

e. Were the expected results obtained?

Score: 4. Reports document that the objectives were achieved or likely to be achieved (results driven)
Score: 2. Reports show partial success but achievement to date suggest that objectives will likely be met
Score: 0. Reports indicate little measure of success or promise that results will be obtained.

Performance evaluation actions

(i) Projects or activities that do not receive a positive evaluation (<60% of maximum score) will be notified of what actions need to be taken to improve performance and given an appropriate time frame for improvement.
(ii) Projects or activities that receive a negative evaluation will be subject to a recommendation to the next Session of the IODE Committee to have IODE endorsement withdrawn. The project or activity may not continue to operate as an IODE project or activity nor funds expended unless an approved performance improvement plan is developed and approved by the IODE-MG. Proposers may submit a new project request for funding.

Metrics for success

All IODE projects and activities, whether on-going or proposed, should provide clear evaluation criteria that meet IODE-MG defined elements.

(i) A progress report outlining achievements based on the proposed work to date, while a final report outlines what has been accomplished.
(ii) If projects or activities do not provide an annual report or if progress is less than satisfactory with respect to deliverables, then these projects or activities shall not be considered for another funding cycle unless clear actionable remedies are put in place.

For example, if a project or activity did not provide stated deliverables or meet objectives for which funding and/or IODE Project Office support was made available then this could be considered as a metric for not recommending further support or endorsement.

Decision IODE-XXIV.4

OCEAN DATA AND INFORMATION SYSTEM

The IOC Committee on International Oceanographic Data and Information Exchange,

Recalling that a team of external auditors was engaged by UNESCO in 2016 to undertake an audit of aspects of Intergovernmental Oceanographic Commission (IOC) operations,

Noting the recommendation of the external auditor that a draft resolution be submitted to the IOC Assembly calling for Member States to work together, with the support of IOC, to construct a universal information system and ocean data portal, along with a cost-benefit analysis prepared in advance by IODE,

Noting further the need for IODE and external collaborators to work together to effectively address the challenges to facilitate the development of a universal view of the marine data and information landscape,

Taking into account, and building upon, the work carried out by the JCOMM/IODE ETDMP and the IODE Ocean Data Portal,

Recognizing there is a major component of the ocean data and information system landscape not linked to the IOC and there is a need to collaborate with those communities/systems in order to achieve improved accessibility, unrestricted use and interoperability of data and information,

Decides that IODE will work with existing stakeholders, linked and not linked to the IOC, to improve the accessibility and interoperability of existing data and information, and to contribute to the development of a global ocean data and information system, to be referred to as the IOC Ocean Data and Information System, leveraging established solutions where possible,

Decides further to establish an inter-sessional working group to finalize the concept paper for the Ocean Data and Information System, with the Terms of Reference attached in Annex A to this Decision.

Annex A
Terms of Reference of the Inter-sessional Working Group to develop a concept paper for the Ocean Data and Information System

Objectives
The objective of the Inter-sessional Working Group for the Ocean Data and Information System (IWG-ODIS) is to finalize concept paper.

The IWG-ODIS will:

(i) Prepare a brief introductory document summarising the Ocean Data and Information System Concept Paper (IOC/IODE-XXIV/6.2.1, 19 March 2017), including general proposal of benefits and impacts, for the 29th session of the IOC Assembly in June 2017;
(ii) Identify and recommend a strategy to move towards the implementation of a universal marine data and information system in response to the 2016 external audit of the IOC and its activities;
(iii) Further develop the concept paper to construct a universal information system and data portal, to be known initially as the IOC Ocean Data and Information System (ODIS), based on the Ocean Data and Information System Concept Paper (IOC/IODE-XXIV/6.2.1, 19 March 2017) and feedback from the 29th Session of the IOC Assembly;

(iv) Liaise and collaborate with other IOC programmes and with JCOMM, to ensure ODIS is inclusive and supports stakeholders at all levels;
(v) Develop a cost-benefit analysis for ODIS to determine potential infrastructure, development, implementation, and maintenance costs;
(vi) Define the scope of ODIS in areas such as content coverage, system coverage and search, access, and visualization capabilities;
(vii) Finalize and submit the Concept Paper for consideration and approval by IODE-XXV.

Membership

Membership of the group shall include representatives from IODE, GOOS, HAB, MPR, and JCOMM. External collaborators will also be invited to contribute to IWG-ODIS. The IWG-ODIS will carry out its work electronically. Representatives from IODE will include Belgium, IODE Co-Chair (Ms Cyndy Chandler), Netherlands, Canada, USA, Australia, Mexico.

Recommendation IODE-XXIV.1

REVISED TERMS OF REFERENCE OF THE JOINT IAMSLIC/IODE GROUP OF EXPERTS ON MARINE INFORMATION MANAGEMENT IN A TRANSITIONAL CAPACITY

The IOC Committee on International Oceanographic Data and Information Exchange,

Recalling Recommendation IODE-XXII.1 establishing the Joint IODE/IAMSLIC Group of Experts on Marine Information Management,

Acknowledging the past accomplishments of the Joint IODE/IAMSLIC Group of Experts in Marine Information Management,

Recognizing the need to move IODE towards a new management structure,

Noting the importance of marine information to the IOC Strategic Goals,

Recommends to continue the GE-MIM in a transitional capacity until the 25th Session of the IODE Committee in 2019 but revising its terms of reference as follows:

(i) Promote amongst the marine information community applications to join IODE as IODE Associate Information Units (AIU),
(ii) Design the AIU Application Form and Process,
(iii) Review and approve (as appropriate) applications of AIU candidate centres,
(iv) Identify suitable joint activities between IODE and IAMSLIC,
(v) Draft terms of reference for the proposed IODE working group on marine information management, for submission to IODE-XXV,

Membership will be renewed and comprise up to 8 members, including:

(i) Four members nominated by IODE
(ii) Four members nominated by IAMSLIC.

Recommendation IODE-XXIV.2

THE UNESCO/IOC PROJECT OFFICE FOR IODE IN OOSTENDE, BELGIUM

The IOC Committee on International Oceanographic Data and Information Exchange,

Recalling

(i) Resolution XXII-7 which accepted with appreciation the offer of the Government of Flanders (Kingdom of Belgium) and the city of Oostende to host the IODE Project Office,
(ii) Resolution XXII-1 which adopted the Guidelines for the Establishment of IOC Decentralized Offices, subsequently published in Document IOC/INF-1193,

Noting with appreciation

(i) the positive results of the external review by UNESCO of the IODE programme and its IOC project Office for IODE (2002-2006), the positive assessment of the performance of the IOC Project Office for IODE by the IODE Committee during its nineteenth Session, and the positive outcome of the review of the performance of the IOC Project Office for IODE as part of the external review of the Flanders Marine Institute,
(ii) that the IOC Project Office for IODE has exceeded the expected implementation of its objectives:
    - the successful development and hosting of data/information products/services such as web sites including the IOC web sites, IODE OceanDocs, IODE OceanExpert, IODE Ocean Data Portal,
    - the successful development and hosting of the training system OceanTeacher and OceanTeacher Global Academy,
    - the successful provision of training over the past 10 years of more than 2000 learners from more than 100 countries at the Project Office, as well as the high appreciation expressed by students on the quality of the courses and the facilities,
    - the establishment of an excellent international meeting and conference centre.
(iii) the considerable financial support provided by the Government of Flanders (Kingdom of Belgium) to the IOC in general and to the IOC Project Office for IODE and the excellent in-kind support provided by the Flanders Marine Institute (VLIZ),
(iv) the complementary nature of the activities carried out at the Project Office and the financial support provided by the Government of Flanders (Kingdom of Belgium) through the UNESCO/Flanders Fund-in-Trust for the support of UNESCO's activities in the field of Science (FUST),
(v) the contribution by the IOC Project Office for IODE (as the IODE secretariat and Meeting & Training Facility) to the further development of Ocean Data and Information Networks in developing regions,
(vi) the efficient and effective management of the Project Office and the professionalism of its Staff,

Considering that the Office in Oostende is now assisting fully in the implementation of the IODE Programme, including the regional implementation of the IODE Programme,

Expressing its profound gratitude to the Government of Flanders (Kingdom of Belgium) and the Flanders Marine Institute (VLIZ) for:
(i) the considerable support provided, both financially and by hosting of the Project Office, as from April 2005,
(ii) the offer to continue hosting and supporting the Office in Oostende, Belgium,

Recommends that:

(i) the IOC Project Office for IODE be continued,

(ii) the offer of the Government of Flanders (Kingdom of Belgium) to continue hosting the Office in Oostende, Belgium, on the same terms as the previous MOU, be accepted,

(iii) the Memorandum of Understanding between UNESCO/IOC and the Government of Flanders (Kingdom of Belgium) through the Flanders Marine Institute (VLIZ) be renewed in accordance with the offer of the Government of Flanders (Kingdom of Belgium).

Recommendation IODE-XXIV.3

ESTABLISHMENT OF THE IODE PILOT PROJECT OBIS EVENT DATA FOR SCIENTIFIC APPLICATIONS (OBIS-EVENT-DATA)

The IOC Committee on International Oceanographic Data and Information Exchange,

Welcoming the successful development of an information technology solution for the management and exchange of biodiversity observation data that include environmental measurements by OBIS through the 2-year IODE pilot project OBIS-ENV-DATA in 2015-2017,

Noting that the OBIS-ENV-DATA technology solution addressed not only combined biological and environmental data, but also incorporates details about sampling methods and effort, including the implementation of identifiers to reference standard vocabulary for the parameters involved in biological, environmental, and sampling details. This expanded OBIS's capacity for biological details and enabled OBIS to organize, aggregate, and link ocean observation events using "event hierarchy". OBIS now refers to this complete combination of data features, including biological, environmental, sampling details and event hierarchy, as "OBIS Event Data".

Recommends the establishment of OBIS-EVENT-DATA as a pilot project of IODE, with limited duration (2 years), and with the terms of reference as attached in annex A to this Recommendation,

Recommends the establishment of the IODE Steering Group for OBIS-EVENT-DATA, with the terms of reference as attached in annex B to this recommendation,

Invites OBIS nodes, NODCs and ADUs to express their interest in joining this new activity by sending a letter (by email) to the Steering Group chair before 31 May 2017,

Annex A
Terms of Reference of the IODE OBIS-ENV-DATA Project

Objectives

The main objectives of this project are to (i) enhance the scientific applications of OBIS Event Data with the aim to support data and information product development within the framework of GOOS and GEOBON MBON, (ii) select early adopters of OBIS Event Data from among the marine biodiversity monitoring communities of Practice, (iii) further validation/evaluation of OBIS-ENV-DATA, (iv) develop data products and applications, (v) develop training packages for scientists and (vi) report results at IODE-XXV in 2019.

The following institutions expressed interest:

- CENPAT-CONICET/ArOBIS, Argentina
- CSIRO/AU-OBIS, Australia
- SCAR/AntOBIS, Belgium
- VLIZ/EurOBIS, Belgium
- HCMR/MedOBIS, Greece
- NIWA/SWP-OBIS, New Zealand
- NIOZ, The Netherlands
- UkrSCES/Black-Sea OBIS, Ukraine
- GBIF, Denmark
- MBON Florida Keys National Marine Sanctuaries project, USA

Annex B
Terms of Reference of the IODE Steering Group for OBIS-EVENT-DATA (SG-OBIS-EVENT-DATA)

Objectives

The Steering Group coordinates the project, and members report on the activities and progress towards the expected outcomes, or problems encountered, as defined in the work plan (working document IOC/IODE-XXIV/3.4.1.1). The chair will report to the IODE Officers and the IODE Committee.

Membership

The Steering Group membership includes a representative of each participating institution and will be chaired by Mr Francisco Hernandez (Head Data Centre, VLIZ) and assisted by Mr Ward Appeltans (Project Manager, IODE/OBIS secretariat).

Recommendation IODE-XXIV.4

ESTABLISHMENT OF THE OCEAN DATA AND INFORMATION NETWORK FOR THE WESTERN PACIFIC REGION (ODINWESTPAC) PROJECT

The IOC Committee on International Oceanographic Data and Information Exchange,

Recalling that:

(i) the IODE Committee, during its 18th Session (Oostende, Belgium, 26-30 April 2005), decided to abolish the system of IODE Responsible National Oceanographic Data Centres (Resolution IODE-XVIII.1) and the system of IODE Regional Coordinators (Resolution IODE-XVIII.2), and requested that NODCs participating in Ocean Data and Information Networks (ODIN) would assume the functions of former RNODCs, and further requested that the functions of the IODE Regional Coordinators be included in the terms of reference of the relevant IODE ODIN;

(ii) the IOC Sub-Commission for the Western Pacific (IOC/WESTPAC) expressed, at its Sixth Session (NhaTrang, Vietnam,23 – 27 May 2005), its strong interest in developing an ODIN for the WESTPAC region and adopted the recommendation SC-WESTPAC-VI.2 on the establishment of an Inter-sessional Working Group to prepare, as appropriate, a project proposal for an Ocean Data and Information Network for the region including a possible work plan, deliverables, timelines and required resources;

(iii) the Preparatory meeting toward the establishment of ODINWESTPAC, Tokyo, 5-6 December 2006, prepared a pilot project proposal for an Ocean and Data Information Network for the WESTPAC region, for submission to the 19th Session of the IODE Committee (Trieste, Italy, 12-16 March 2007) for adoption; and

(iv) the handover of project leadership from Japan Oceanographic Data Center (JODC) to National Marine Data and Information Service (NMDIS) of China at the Seventh Session of IOC/WESTPAC (Kota Kinabalu, Sabah, Malaysia, 26–29 May 2008).

Noting with appreciation the strong support by NMDIS for the preceding pilot project,

Noting further the future excellent opportunity to cooperate with the IOC Sub-Commission for the Western Pacific in improving regional capacity for ocean data and information management,

Establishes the ODINWESTPAC Project with terms of reference as attached in Annex A, as well as a Steering Group of which terms of reference are attached in Annex B

Establishes the ODINWESTPAC Advisory Group with terms of reference as attached in Annex C

Decides that ODINWESTPAC will enhance the communication and technical collaboration with existing data and information systems and the proposed IOC Ocean Data and Information System.

Confirms the nominations, by the First ODINWESTPAC Advisory Group Meeting (Tianjin, China, 27-28 January 2017), of Dr Shi Suixiang, the Deputy-Director of NMDIS to be the Project Coordinator,

Requests member states of the IOC/WESTPAC to actively participate in the project,

Invites all IOC Programmes and other relevant organizations to collaborate with ODINWESTPAC,

Encourages the Project Coordinator to establish close communication and cooperation with IOC/WESTPAC Intergovernmental Sessions to serve the needs of member states in the region,

Further encourages member states of the IOC/WESTPAC and donors to support this project by providing financial and/or in-kind support towards the implementation of this project.

ANNEX A
TERMS OF REFERENCE OF THE IODE ODINWESTPAC PROJECT

The Ocean Data and Information Network for the Western Pacific Region (ODINWESTPAC) has been one of the projects of the International Oceanographic Data and Information Exchange programme (IODE) of the Intergovernmental Oceanographic Commission of UNESCO (IOC). It brings together more than twenty countries in WESTPAC to address the challenges faced in accessing data and information for coastal management.

ODINWESTPAC was initiated to provide an effective capacity building framework, to promote regional collaboration in marine data and information and products sharing, to develop cooperation with other ODINs and international and regional projects/programs, and to provide data and information services mainly for the WESTPAC member states and other users.

ODINWESTPAC constitutes a capacity building strategy, linking training, equipment and operational support in a regional context, products and service oriented and using a multi-stakeholder approach.

Objectives
- Develop a marine data and information network that will promote data and information exchange and collaboration between WESTPAC member states and with the global IODE network;
- Provide a number of marine data and information products, ocean knowledge to serve the needs of WESTPAC member states and other ODINs and IODE members in data and information management, oceanographic research, marine environmental protection, marine hazards prevention and mitigation, etc.;
- Develop cooperation with other international and regional projects in data and imformation collection, processing, management and service;
- Implement relevant capacity building activities which specifically relate to ocean data and information management and service.

ANNEX B
TERMS OF REFERENCE OF THE IODE STEERING GROUP FOR THE ODINWESTPAC PROJECT

Objectives
- To provide strategic direction and oversight to the project to ensure that it meets its aims and objectives;
- To ensure that the ODINWESTPAC meets the needs of users of data and information;
- To ensure that the ODINWESTPAC builds on and adds value to existing national and regional collaboration for marine observation and data and information management;
- To review and approve the action plan/ workplan of ODINWESTPAC and ensure that the ODINWESTPAC activities carried out during the intersessional period are consistent with the action plan/workplan;
- To oversee the work of the Project Coordinator and Advisory Group.

Membership
Members of the Steering Group for the ODINWESTPAC Project include:

- IODE national coordinators for oceanographic data management, IODE national coordinators for Marine Information Management, all from the WESTPAC region Member States,
- In an observer capacity, ADU contact points, AIU contact points, all from the WESTPAC region Member States,
- Chair, IOC Sub-Commission for the Western Pacific (WESTPAC)
- Representative of UNESCO/IOC Project Office for IODE,
- Head, UNESCO/IOC Regional Secretariat for WESTPAC,

The Project Coordinator shall serve as the chairperson for the Steering Group.

ANNEX C
TERMS OF REFERENCE OF THE ADVISORY GROUP FOR THE ODINWESTPAC PROJECT

Objective

The ODINWESTPAC Advisory Group aims to facilitate the ODINWESTPAC activity. For this purpose, the ODINWESTPAC Advisory Group has the responsibility to provide scientific and technical advice on development, planning and implementation of the project to the Project Coordinator.

Composition

The ODINWESTPAC Advisory Group, composed of the Project Coordinator and some experts in relevant disciplines of marine data and information management (and other experts could be invited to join the AG meeting). The Project Coordinator will select up to six experts from a pool of volunteers. The selection of members will take into account balanced representation of geographical distribution of the WESTPAC member states, gender, and the basis of their professional expertise. Additional experts may be consulted as needed. The Project Coordinator should contact ODINWESTPAC National Focal Point, the related IODE National Coordinators, and other sources of expertise, to identify the expert pool based on the experts' willingness. The term of experts in the ODINWESTPAC Advisory Group is two years in office, with the option to renew.

Chairperson

The Project Coordinator shall serve as the chairperson for the Advisory Group. The chairperson shall be responsible for representing the Advisory Group and reporting to the ODINWESTPAC Steering Group. The chairperson shall report to the IOC Committee on International Oceanographic Data and Information Exchange (IODE) and IOC/WESTPAC, at their respective regular sessions, as the Project Coordinator.

Operation of the Advisory Group

The Advisory Group should conduct its business by emails and telecommunication means. It may organize face to face meetings if necessary, in order to facilitate discussion among members.

Responsibilities

- Provide technical advice on
  - The future development of the ODINWESTPAC;
  - A short- and long-term strategic plan associated with Ocean Data and Information Network (ODIN);
  - Assess the requirements for the implementation of the project, including approaches to identifying and mobilizing these requirements;
  - Review the present status of the project and identify the challenges faced and potential improvements;
  - Make necessary recommendations towards the project and to advise the participating countries to facilitate progress;
  - Facilitation of cooperation among member states in the region.

Membership

The initial membership of the Advisory Group for the ODINWESTPAC Project was agreed at the First Session of the Advisory Group for the Ocean Data and Information Network for the WESTPAC region (ODINWESTPAC), Tianjin, China, 27-28 January 2016 and recorded in IOC Workshop Report No. 274.

Recommendation IODE-XXIV.5

IODE ASSOCIATE INFORMATION UNIT (AIU)

The IOC Committee on International Oceanographic Data and Information Exchange,

Acknowledging the success of the IODE Associate Data Units (ADU) as key partners in realizing the IODE objectives,

Noting the importance of including the wider ocean information community as key stakeholders of the IODE,

Noting further the growth of ocean research and observation programmes and projects, and the necessity for these projects to establish data and information models,

Stressing the need to share, provide discovery and access to and to preserve all ocean research and observation information,

Noting the importance of standardization and interoperability of data and information systems across the ocean research and observation communities,

Recalling that IODE presently has no direct communication with individual marine science libraries and information centres resulting in minimal engagement,

Recommends the establishment of IODE Associate Information Units (AIUs) as a structural element of IODE with the following Terms of Reference:

IODE Associate Information Units (AIUs) shall:

(i) Be national projects, programmes, institutions or organizations, or regional or international projects, programmes, institutions or organizations (including academia) that carry out marine information management functions,
(ii) Be staffed by at least one marine information professional (by qualification or experience),
(iii) Receive information on, and contribute to, IODE standards and best practices related to marine information management,
(iv) Be welcomed to participate in ocean data and information management training, organized within the framework of the IODE OceanTeacher Global Academy programme,
(v) Participate in IODE workshops and projects,
(vi) Share expertise with other AIUs,
(vii) Be invited to share new digital initiatives implemented within the AIUs
(viii) Provide advice and where appropriate become an IODE Project member
(ix) Receive assistance, upon request, from IODE, on matters related to marine information management,
(x) Closely link with the IODE National Coordinator for Marine Information Management if existing
(xi) Agree to display IODE logo on appropriate marine information output
(xii) Agree to make available information management documentation (standards, practices, guides,…) used by the AIU for the wider marine science library and information community,

Invites any marine science related project, programme, institution or organization that is willing to comply with the above-mentioned Terms of Reference to apply to join IODE as an IODE Associate Information Unit (AIU) by providing the following information:

(i) name and contact information of the AIU contact point(s);
(ii) name and contact point of the head of the applicant entity;
(iii) description of the national, regional or international project, programme, institution or organization;
(iv) brief description of information services/products/digital initiatives provided by the entity;
(v) description of staff and skills/expertise;
(vi) metrics on budget and collections;
(vii) for projects: expected lifespan of the project and indication of plans for the archival/preservation of the information output;
(viii) letters of support;
(ix) required capacity building, training that IODE could contribute;
(x) on the existing relationship with IODE.

Invites IOC Member States to actively promote AIU membership,

Further recommends that applications for AIUs shall be reviewed by the Joint IODE/IAMSLIC Group of Experts on Marine Information Management (in a transitional capacity) and approved by the IODE-MG (by email or during IODE-MG meetings).

Recommendation IODE-XXIV.6

IODE WORK PLAN AND BUDGET FOR 2017-2019

The IOC Committee on International Oceanographic Data and Information Exchange,

Having reviewed its programme implementation requirements for the period 2017-2019,

Being aware of the continuing financial crisis faced by UNESCO and its IOC,

Re-emphasizing the importance of high-quality oceanographic data and information, products and services for scientific, observation and ocean based disaster warning and mitigation programmes of the Commission, for Member States, the private sector and other users,

Noting the important role of IODE in JCOMM and the growing collaboration with, and contribution to other IOC Programmes and activities, demonstrated by joint development of products and services as well as capacity development activities, responding to the IOC Strategic Plan for Oceanographic Data and Information Management,

Expressing great appreciation to the Government of Flanders (Kingdom of Belgium) for hosting and supporting the IOC Project Office for IODE and for its continuing and increasing financial support to IODE, the Russian Federation for its support through the hosting of the Partnership Centre for the IODE Ocean Data Portal in Obninsk, as well as to other donors and Member States who are providing financial and in-kind support for IODE,

Appreciating the in-kind support for the IODE Programme provided by Member States through establishing and maintaining IODE Data Centres, OBIS nodes and Associate Data Units, provision of experts, through the provision of valuable ocean data and information products and services, and through financial and in-kind contributions to IOC,

Calls on Member States to provide financial support to the IOC Special Account, earmarked for IODE, or in-kind support through the secondment of experts to the IOC Project Office for IODE or to the IODE secretariat;

Requests to the IODE Co-Chairs to bring to the attention of the next Session of the IOC Assembly, the IODE Programme and Budget for the period 2017-2019, as attached in the Annex to this Recommendation.

ANNEX

RP= UNESCO regular programme funds
PO= financial contribution received by the IOC Project Office for IODE from the Government of Flanders under the MoU between IOC and VLIZ
Totals column = sum of funds requested for 2017 and 2018 under agenda item

= MODIFIED FROM INITIAL REQUEST

		REQUESTED		TOTALS	RP	PO	RP	PO
	PROJECT/ACTIVITY	**2017**	**2018**	**2017-18**	**2017**		**2018**	
3.2.1	**ETDMP (provisional)**							
	- session June 2018 Oostende	0	15,000	**15,000**				15,000
3.2.2	**GEMIM (provisional)**							
	- joint IAMSLIC/IODE pre-conference training	5,000	5,000		5,000		5,000	
	- ASFA Board participation Sept 2017	2,000	2,000		2,000		2,000	
	- WESTPAC collaborative activities meeting Oct17	0	0	**14,000**				
3.4.1	**OBIS**							
	- EC-OBIS-II November 2017	10,000				10,000		
	- SG-OBIS-VII March 2018 Argentina		24,000				24,000	
	- OBIS event workshops 2017, 2018	0	15,000					15,000
	- OBIS technical meeting Belgium April 2017	5,000				5,000		
	- OBIS node training Belgium, fall 2018		0					
	- OBIS GCRMN training Malaysia, October 2017	0						
	- travel 2017, 2018	0	0	**54,000**				
3.4.2	**GODAR**							
	- GODAR Argentina data digitization	8,000	0	**8,000**	8,000			
3.4.3	**WODB**	0	0	**0**				
	- no budget requested							
3.4.4	**GTSPP**							
	- SG-GTSPP-4 June 2018 Oostende	0	20,000	**20,000**				20,000
3.4.5	**GOSUD**							
	- SG-GOSUD, 2018		20,000	**20,000**				20,000
3.4.6	**ICAN**							
	- expert travel	2,000	4,000		2,000		4,000	
	- website migration and maintenance	750	500		750		500	
	- searchable CWA catalogue	0	4,000				4,000	
	- ICAN-8 - Santa Marta	3,000	0		3,000			
	- SG-ICAN - Santa Marta	10,000	0	**24,250**	10,000			
3.4.7	**IQUOD**							
	- completing AutoQC programming	2,000	0			2,000		
	- SG-IQUOD-3 and 5th workshop	10,000	0		10,000			
	- SG-IQUOD-4 and 6th workshop	0	10,000	**22,000**			10,000	
3.4.8	**OceanDataPortal**							
	- SG-ODP	15,000	0			15,000		
	- ODP training ODINBlackSea	0	0					
	- ODP training ODINWESTPAC	0	0					

	- travel	0	3,000				3,000	
	- particpation in conferences	0	5,000	**23,000**			5,000	
3.4.9	**OceanDataPractices**							
	- software development contractor (dec17)	0	4,000	**4,000**			4,000	
3.4.10	**OceanDocs**							
	- SG-OceanDocs meeting (aug18) oostende	0	15,000					15,000
	- IT support	0	0					
	- translation user guides	2,000	0	**17,000**		2,000		
3.4.11	**OceanExpert**							
	- SG-OceanExpert meeting (nov)	0	0	**0**				
3.4.12	**OceanKnowledge**							
	- SG-OceanKnowledge (nov) oostende	20,000	0			20,000		
	- technology sub-committee meeting oostende	0	11,000					11,000
	- consultant cost data model	0	12,000	**43,000**				12,000
3.4.13	**OpenScienceDirectory**	0	0	**0**				
	- no budget requested							
3.4.14	**QMF**							
	- no budget requested	0	0	**0**				
3.5.1	JCOMM							
3.5.2	**IOC**							
3.5.2.2.2	- SPINCAM travel cost inception meeting	2,000	0		2,000			
3.5.2.2.3	- LME:learn - travel cost IODE staff to Steering Committee	0	2,000	**4,000**			2,000	
3.5.3	EU projects							
3.5.4	ICSU WDS							
3.5.5	RDA							
3.5.6	IIOE2							
3.6.1	**ODINAFRICA**							
	- African Ocean Data and Information portal	4,000	4,000			4,000	4,000	
	- African Coastal and Marine Atlases training workshop	0	0					
	- Marine biodiversity and biogeography programme		8,000	**16,000**			8,000	
3.6.2	**ODINBLACKSEA**							
	- steering committee meetings (september)	15,000	0			15,000		
	- training in Russian NODC (nov)	5,000	0		5,000			
	- training in Turkish NODC (nov)	0	5,000				5,000	
	- expertise assistance to MS in the region	4,000	4,000	**33,000**	4,000		4,000	
3.6.3	**ODINCARSA-LA**							
	- expert visits (oct)	3,750	3,500		3,750		3,500	
	- training	0	0					
	- OceanDocs	500	500		500		500	
	- IAMSLIC conference participation support	4,000	0		4,000			
	- marine digital library	2,000	2,000	**16,250**	2,000		2,000	
3.6.4	**ODINCINDIO**							
	- expert visits	5,000	0		5,000			
	- Regional training	10,000		**15,000**	10,000			

3.6.5	**ODINECET**							
	- no budget available	0	0	**0**				
3.6.6	**ODINWESTPAC**							
	- 2017 regional workshop (implementation started)	20,000	0	**20,000**		20,000		
	European training hub activities	30,000	40,000	**70,000**		30,000		40,000
	STAFF TRAVEL	0	15,000	**15,000**			15,000	
	TOTALS	-200,000	-253,500	-453,500	-77,000	-123,000	-105,500	-148,000
	REVENUE IOC RP	75,000	103,500	178,500	75,000		103,500	
	REVENUE FLANDERS TO IODE PO	125,000	150,000	275,000		125,000		150,000
	TOTAL REVENUE	**200,000**	**253,500**	**453,500**				
	BALANCE	**0**	**0**	**0**	-2,000	2,000	-2,000	2,000

Draft Decision of the 29th Session of the IOC Assembly (Agenda item 6.2.2)

IOC STRATEGIC PLAN FOR DATA AND INFORMATION MANAGEMENT (2017-2021)

The Intergovernmental Oceanographic Commission,

Recalling:
(i) IOC-XXVII/Dec.5.3.4 which adopted the IOC Strategic Plan for Oceanographic Data and Information Management (2013-2016) and also agreed that the Plan should be regularly reviewed and revised by the IODE Committee, and
(ii) Resolution XXII-6 which adopted the IOC Oceanographic Data Exchange Policy.

Recognizing that:
(i) the IOC Oceanographic Data Exchange Policy is compatible with other international relevant data-exchange policies that promote free and open access to data, such as WMO Resolution 40,
(ii) IODE has developed a global network of National Oceanographic Data Centres, Associate Data Units, information centres and related networks, representing a considerable pool of expertise in data and information management and sharing,
(iii) many IOC Member States have developed distributed networks of data management facilities involving IODE, as well as other centres, to deal with a wide variety of ocean observations,
(iv) IOC and WMO have established close, efficient and effective collaboration in ocean data management, and
(v) the IOC Committee for IODE and JCOMM have established a number of joint mechanisms to advance ocean data management.

Noting with appreciation that the IOC Data and Information Management system resulting from this strategy will deliver:
(i) Assembled, quality controlled and archived data on a diverse range of variables according to scientifically sound and well-documented standards and formats,
(ii) Timely dissemination of data on a diverse range of variables (observations and model outputs) both on real-time and delayed modes depending on the needs of user groups and their technical capabilities (automatic dissemination as well as “on demand”), and
(iii) Easy discovery and access to data and information on a diverse range of variables and derived products (including forecasts, alerts and warnings) by users who have a broad range of capabilities.

Considering that the objectives of the IOC Strategic Plan for Data and Information Management 2017–2021 are to:
(i) Facilitate and promote the exchange of oceanographic data and information in compliance with the IOC Oceanographic Data Exchange Policy,
(ii) Deliver a comprehensive distributed data system that can receive data collected by all IOC programmes and projects and deliver them in a uniform and transparent way to all users,
(iii) Deliver a system that can collect bibliographic and factual information from all IOC programmes and projects and deliver them in a uniform and transparent way to all users, and
(iv) Ensure alignment with, and contribution to, both the IOC’s Medium Term Strategy for 2014-2021, and with the UN’s 2030 Agenda for sustainable development, in particular the dedicated sustainable development goal for the ocean (Conserve and sustainably use the oceans, seas and marine resources for sustainable development).

Endorses the IOC Strategic Plan for Data and Information Management 2017-2021 as given in document IOC-XXIX/2 Annex […],

Agrees that the Plan should be:

(i) Published and distributed widely and used as a basic data strategy throughout the Programmes and Projects of the IOC, and

(ii) Regularly reviewed and revised by the IODE Committee, in close consultation with all IOC programmes.

Draft Decision of the 29th Session of the IOC Assembly (agenda item 6.2.1)

IOC COMMUNICATION AND OUTREACH STRATEGY FOR DATA AND INFORMATION MANAGEMENT

The Intergovernmental Oceanographic Commission,

Recalling Decision IODE-XXIII.3 for the Establishment of an Inter-sessional Working Group to Create an IOC Communication and Outreach Strategy for Data and Information Management,

Acknowledging the importance of the need for greater visibility and understanding of its activities and achievements for the management of data and information,

Noting the growing number of international marine science related organizations and the importance to clearly state IODE's unique role in data and information management,

Recognizing that:
(i) IOC must work with Member States, governments, partner organizations, academia and industry, to articulate the global benefits to society and required funding to build and sustain the ocean observing data and information system,
(ii) IOC has a strong mandate for communication and outreach with a variety of stakeholders, including the general public,
(iii) IOC needs to communicate regularly with its community as well as having a strategy on how to be engaged in ocean community data and information activities, cooperate and expand its membership,

Endorses the IOC Communication and Outreach Strategy for Data and Information Management as given in document IOC-XXIX/2 Annex […],

Agrees that the Plan should be:
(i) Published and distributed widely and used as a framework for communication and outreach activities throughout the Programmes and Projects of the IOC, and
(ii) Regularly reviewed and revised by the IODE Committee, in close consultation with all IOC programmes.

ANNEX III

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ANNEX IV

LIST OF DOCUMENTS

Agenda Documents

Agenda #	Code	Title

Agenda Documents

Agenda #	Code	Title
2.1.	IOC/IODE-XXIV/2	IODE-XXIV: ACTION PAPER
2.1.	IOC/IODE-XXV/1 add. prov.	IODE-XXIV: Provisional Timetable
2.3.	IOC/IODE-XXV/1 add. prov.	IODE-XXIV: Provisional Timetable
3.1.	IOC/IODE-Off-2016/3	2016 IODE Officers Meeting, IOC Project Office for IODE, 20-22 January 2016: SUMMARY REPORT
3.1.	IOCIODE-XXIV/3.1	IODE-XXIV: PROGRESS REPORT ON THE IODE-XXIII WORK PLAN
3.2.1.	IOC/IODE-XXIV/3.2.1	IODE-XXIV: Joint JCOMM/IODE Expert Team on Data Management Practices - JCOMM/IODE ETDMP
3.2.2.	IOC/IODE-XXIV/3.2.2	IODE-XXIV: IODE Group of Experts on Marine Information Management (GE-MIM)
3.3.	IOC/IODE-XXIV/3.3.1.a	IODE-XXIV: Status of the IODE Network - Part 1: Data Management
3.3.	IOC/IODE-XXIV/3.3.1.b	IODE-XXIV: Status of the IODE Network - Part 2:Marine Information Management
3.3.1.	IOC/IODE-XXIV/3.3.1 c	IODE-XXIV: Report on the MoU between VLIZ and UNESCO/IOC on the IOC Project Office for IODE
3.4.1.	IOC/IODE-XXIV/3.4.1	IODE-XXIV: Ocean Biogeographic Information System (OBIS)
3.4.1.1.	IOC/IODE-XXIV/3.4.1.1	IODE-XXIV: Pilot Project Proposal: OBIS Event Data for Scientific Applications (Draft)
3.4.2.	IOC/IODE-XXIV/3.4.2	IODE-XXIV: Global Oceanographic Data Archaeology and Rescue (GODAR)
3.4.3.	IOC/IODE-XXIV/3.4.3	IODE-XXIV: World Ocean Database (WODB)
3.4.4.	IOC/IODE-XXIV/3.4.4	IODE-XXIV: Global Temperature Salinity Profile Programme
3.4.5.	IOC/IODE-XXIV/3.4.5	IODE-XXIV: Global Ocean Surface Underway Data (GOSUD)
3.4.6.	IOC/IODE-XXIV/3.4.6	IODE-XXIV: International Coastal Atlas Network (ICAN)
3.4.7.	IOC/IODE-XXIV/3.4.7	IODE-XXIV: IODE International Quality-controlled Ocean Database (IODE-IQuOD)
3.4.8.	IOC/IODE-XXIV/3.4.8	IODE-XXIV: IODE Ocean Data Portal
3.4.9.	IOC/IODE-XXIV/3.4.9	IODE-XXIV: OceanDataPractices
3.4.10.	IOC/IODE-XXIV/3.4.10	IODE-XXIV: OceanDocs
3.4.10.	OceanDocs leaflet 2016	
3.4.11.	IOC/IODE-XXIV/3.4.11	IODE-XXIV: OceanExpert
3.4.12.	IOC/IODE-XXIV/3.4.12	IODE-XXIV: Ocean Knowledge Platform Pilot Project (OceanKnowledge)
3.4.14	IOC/IODE-XXIV/3.4.14	IODE-XXIV: IODE Quality Management Framework (QMF)
3.5.1.1.	IOC/IODE-XXIV/3.5.1.1	IODE-XXIV: Ocean Data Standards and Best Practices (ODSBP)
3.5.2.2.1.	IOC/IODE-XXIV/3.5.2.2.1	IODE-XXIV: SPINCAM 3
3.5.2.2.2.	IOC/IODE-XXIV/3.5.2.2.2	IODE-XXIV: LME:LEARN
3.5.5.	IOC/IODE-XXIV/3.5.5	IODE-XXIV: Brief report on cooperation of IODE in the Research Data Alliance
3.5.6.	IOC/IODE-XXIV/3.5.6	IODE-XXIV: Brief report on cooperation of IODE in the International Indian Ocean Expedition II (IIOE-2)
3.5.7.	IOC/IODE-XXIV/3.5.7	IODE-XXIV: Research Coordination Network (RCN): Sustained Multidisciplinary Ocean Observations (RCN:OceanObsNetwork)
3.6.1.	IOC/IODE-XXIV/3.6.1	IODE-XXIV: Ocean Data and Information Network for Africa (ODINAFRICA)
3.6.2.	IOC/IODE-XXIV/3.6.2	IODE-XXIV: Ocean Data and Information Network or the Black Sea region (ODINBLACKSEA)
3.6.3.	IOC/IODE-XXIV/3.6.3	IODE-XXIV: Ocean Data and Information Network for the Caribbean and Latin America (ODINCARSA-LA)
3.6.4.	IOCINDIO-V/3s	Executive Summary Report of the Fifth Session of the IOC Regional Committee for the Central Indian Ocean (IOCINDIO), 25–27 April 2016, Chennai, India
3.6.5.	IOC/IODE-XXIV/3.6.5	IODE-XXIV: ODINECET
3.6.6.	IOC/IODE-XXIV/3.6.6	IODE-XXIV: Ocean Data and Information Network for the Western Pacific Region (ODINWESTPAC)
4.1.	IOC/INF-1332	IOC Capacity Development Strategy 2015-2021

4.1.	IOC/IODE-XXIV/4.1	IODE-XXIV: Report on the IOC Capacity Development Strategy and its implementation plan
4.2.1.	IOC/IODE-XXIV/4.2.1	IODE-XXIV: OceanTeacher Global Academy (OTGA) Project
4.2.2.	IOC/IODE-XXIV/4.2.2	IODE-XXIV: Report on other / new IODE Capacity Development Activities and Opportunities
6.1.	IOC/IODE-XXIV/6.1	IODE-XXIV: Report of the Inter-sessional working Group to Propose a Re-structuring of IODE (Decision IODE-XXIII.1)
6.2.	IOC/IODE-XXIV/6.2	IODE-XXIV: IOC Strategic Plan for Data and Information Management (2017-2021)
6.2.1.	IOC/IODE-XXIV/6.2.1	IODE-XXIV: Ocean Data and Information System - Concept Paperoad
6.3.	IOC/IODE-XXIV/6.3	IODE-XXIV: IODE Communication and Outreach Strategy for Data and Information Management

ANNEX V

OPENING ADDRESS

A- OFFICIATING SPEECH, ASSOCIATE PROFESSOR DR. RAMZAH DAMBUL (27/3/2017)

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LADIES AND GENTLEMEN;

A VERY PLEASANT MORNING TO EVERYONE,

It gives me great pleasure to be here and I want to thank you for making yourself available to be a part of this historic event - the 24th session of the International Oceanographic Data and Information Exchange (IODE) by the Intergovernmental Oceanographic Commission of Unesco along with the local host, the ministry of science, technology and innovation Malaysia (MOSTI).

My friends,

For ages man have stood at the shores of their home country and gazed into the wide open sea. looking towards the horizon they would have entertained the thought of what lies beyond?

These very oceans where man have reached out, mingled and traded, knowledge has been shared and long lasting relationships had been forged.

In that respect, Malaysia has been actively participating in the Intergovernmental Oceanographic Commission for more than 40 years. the appointment of Malaysia as an executive member for 8 terms since 1989-2017 is a testament of its commitment to the commission.

Ladies and Gentlemen,

<u>CHALLENGES IN DATA SHARING</u>

In this era of globalisation, data sharing is vital as it will help in activities of cross checking researches, linking various researches to form continuous studies on relevant issues and reduce redundancies in research and thus avoid wastage of funds, time, energy and resources.

There are several challenges that are likely to be encountered by data providers when they decide to share and exchange their data. upon recognising and addressing issues such as who they are and what is their data, what are their data sharing and exchange protocols and who are the key people to engage within that organisation, there exist the more pertinent challenges which are related closely to the human behaviour itself.

The management of geospatial data by various agencies without consistent policy, proper infrastructure and established standards can create certain difficulties for users to acquire, integrate and analyse data for various objectives; hence can cause reluctance in data sharing between agencies. these differences in coding are among the challenges faced in harmonizing the data structure between what is practiced and what is aspired.

The scarcity of an accepted by all standard data structure is another perennial challenge. we aspire that data structure be designed in accordance to an agreed standard. this will ease the process of data sharing and at the same time do not require the data structure to undergo any translation process for sharing among agencies.

There is also the issue on ownership. central files of organised, unedited data are less likely to cause ownership disputes. this is because individual scientists have not made any verification and validation of any sort on that datasets. it is when these datasets have been carried out by a single or small group of scientists based on individual measurements then it has stronger ownership ties. economic motives, motives of personal power and prospects of conflicts to the measurement's quality all discourage data sharing.

Thus far I have spoken on the need to share data and the challenges faced; yet all is not negative. there is indeed a wind of change as awareness increases amongst the various stakeholders in oceanography research.

INSTITUTE OF OCEANOGRAPHY AND ENVIRONMENT (INOS),
UNIVERSITY MALAYSIA TERENGGANU

A point of success and pride in Malaysia's role in IOC is the institute of oceanography and environment (INOS) of university Malaysia Terengganu. the institute has been recognised as the high centre of excellence (HICOE) in marine sciences and oceanography in spearheading marine research within the country. INOS has been designated as the regional training centre for the ocean teacher global academy, the first in this region to be recognised as an IODE associate data unit (ADU), and it is one (1) out of only four (4) regional training centres (RTC) within the IODE, UNESCO.

CONCLUSION

In finality, i would like to express my pleasure that this 24th IODE session is hosted by Malaysia. it is my fervent hope that this session will be a fruitful one and that many milestones will be covered. on behalf of the Malaysian government we hope you have a wonderful time in Malaysia and that the relationship between Malaysia and UNESCO member countries will be further strengthened. international unity is so important just as the different oceans and seas are never completely separate from one another but eternally united.

Thank you

B- OPENING ADDRESS DR VLADIMIR RYABININ, IOC EXECUTIVE SECRETARY (27/3/2017)

Prof Ramzah Dambul, Deputy Secretary General –, Ministry of Science, Technology and Innovation

Excellencies, ladies and gentlemen,

Let me first of all express the IOC's gratitude to the Government of Malaysia to host this 24th Session of the IOC Committee on International Oceanographic Data and Information Exchange (IODE) in Kuala Lumpur.

Looking back at the past Sessions this Session will be the second one held in the WESTPAC region. The first time we met in this region was in Beijing in 2009.

When the IOC was established in 1960 the founding member states (which included from this region Australia, China, Japan, Korea, Thailand, USSR, USA and Viet Nam), almost immediately realized the need for a global ocean data management system as this was also the time of the first international Indian ocean expedition. This led to the establishment of our IODE in 1961.

In 1960 the IOC objectives were very much aimed at the scientific study of the oceans , of the complex natural phenomena which take place within it, hence the name “oceanographic” commission. Similarly the IODE’s initial objectives were “facilitating of exchange of oceanographic data, the standardization of forms for reporting and coding data, the encouragement of the preparation of data catalogues, and the assistance of development of national oceanographic data centres."

During the next 66 years much has changed. In fact we are no longer an “Oceanographic” Commission but rather an “Ocean” commission: our mandate has expanded considerable to become “to promote international cooperation and to coordinate programmes in research, services and capacity-building, in order to learn more about the nature and resources of the ocean and coastal areas and to apply that knowledge for the improvement of management, sustainable development, the protection of the marine environment, and the decision-making processes of its Member States”.

In 1968 we set up the Pacific Tsunami Warning and Mitigation System followed by several others in 2005; in the early 1990s we started building the Global Ocean Observing System (GOOS) dealing with real-time ocean observations and ocean modeling; in the year 2000 we established, with the WMO, the Joint WMO-IOC Technical Commission for Oceanographic and Marine Meteorology (JCOMM) and during the past decade we started dealing with marine spatial planning, integrated coastal zone management and many other activities that link ocean research and observation with decision making related to oceans and coasts.

Reliable data are the foundation for progress in science and its application to decision-making. To ensure the quality of ocean data the IODE started the establishment of its global network of National Oceanographic Data Centres (NODCs) in 1961. Today we have 63 NODCs and 24 Associate Data Units. If we compare this to our 148 Member States we still have a long way to go to have data management capability in all Member States.

However I see that the number of Associate Data Units (ADUs) is growing rapidly. This demonstrates that the way data are now managed and disseminated has changed: from centralized national facilities to distributed national networks of smaller facilities.

This has of course been made possible by new information technology that allows us to have a data server in our pockets. But this decentralization and miniaturization also brings risks and challenges: project-based data centres risk loosing data when the project ends; using laptops for data archival is risky as the equipment may break down or get stolen. And lack of coordination makes that we often do not know what data are available where.

So the NODCs must be given new responsibilities as coordinators and national archival system sfor the data held by the distributed national network facilities. Similarly we must also look at the World Ocean Database when there are now also CMOCs, DACs and GDACs.
For the end users it must be clear who does what and where can I find what kind of data.

Marine Libraries are at risk: even renowned ocean research institutions and universities are shutting down their specialized libraries including marine libraries. Often it is assumed that the Web offers everything users need. But is this truly the case? We need reliable data but we also need reliable information and not just what Google lists in the first or second page of query results. Is reliable

information available to all our member states or only to those who can afford to pay for it? These are questions IODE should also address.

Looking at the IODE programme I believe we have not yet seen the same evolution in IODE that we have seen in the IOC itself: from pure science to science for decision-making. At the level of the IODE global activities we see activities such as coastal atlases, participation in harmful algal bloom programme, participation in projects like SPINCAM and LME:LEARN and others. But this is often not seen at the national, NODC or ADU level.

In September 2015, the 193 Member States of the United Nations adopted a resolution that identified 17 "Global Goals" that are known as the "Sustainable Development Goals" (SDGs). Goal number 14 is "Life Below Water". The targets deal with marine pollution, sustainable management and protection of marine and coastal ecosystems, ocean acidification, overfishing, coastal and marine conservation, economic benefits to SIDS.

It also includes "Increase scientific knowledge, develop research capacity and transfer of marine technology, taking into account the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries, in particular small island developing States and least developed countries". An important role is therefore given to the IOC and to its IODE: increasing scientific knowledge requires scientific data of proven quality and this is the role of IODE.

I therefore invite IODE to focus at the global, regional but maybe more importantly on SDG-14 by providing the necessary indicators that are required to fulfill the targets and to work closely with other national, regional and global programmes. So also for IODE we must evolve from "International Oceanographic Data and Information" to "International Ocean Data and Information" focusing more on products and services that benefit society and the "global good".

At this moment many of the required links between different entities within national governments do not exist yet: government departments that deal with statistics, fisheries, environment may not link with the institutions in which your NODC or ADU is based. This will need to change and this will require both top-down and bottom-up efforts.

NODCs and ADUs can and should play an essential role in fulfilling the SDG targets. This role will also re-state and demonstrate beyond a doubt the importance of professional data and information management in a time when every expense is under scrutiny.

Another area where we need to make more efforts is the development of a global data and information system. While IODE started working on the IODE Ocean Data Portal about 10 years ago we have not been able to make as much progress as hoped. To some extent the work has been taken on by a few regional initiatives that were better funded but overall at the global level we are still far from our target.

This was also concluded by an IOC audit that took place in 2016: they noted that "There is no common database for all marine sciences, which is certainly unattainable when one considers the amount, complexity and heterogeneity of the information to be assembled, but there is also no common portal for all marine sciences that connects all websites and relevant disciplines through web links". They therefore recommended "to construct a universal information system and ocean data portal".

I look forward to fruitful discussions during this Session on this topic and to a recommendation to the next IOC Assembly in June.

C- OPENING ADDRESS CAPTAIN ZAHARUDDIN MOHD MAIDEEN (28/3/2017)

Dr Vladimir RYABININ
Executive Secretary
Intergovernmental Oceanographic Commission (IOC)

Chairs of IOC Committee on IODE
Ms Cyndy CHANDLER and
Mr Yutaka MICHIDA

Assalamualaikum warahmatullahi wabarakatuh, Selamat Datang' and a warm welcome especially to the foreign participants as well as local participants. Many of you have travelled here today to extend your friendship and to network, in our mutual quest to support, encourage and inspire data exchange and sharing within the globe.

The diversity of participants from throughout six continents serve as an effective platform for a cohesive collaboration amongst us.

Malaysia is indeed very proud to forge a long association with UNESCO since our membership in 1958. Over the years, Malaysia has had the honour and privilege to serve as Executive Board member of UNESCO for four terms and as the IOC Executive Council member for 8 terms, and being actively involved in formulating policies and overseeing the implementation of various programmes.

In this regard and based on this track record, I believe IOC has made the correct choice in designating Malaysia as host to this Conference and Meeting. Just for the record, this would be Malaysia's first time and the second country from Asia after China in 2009, to host this event since IODE started way back in 1962. On a personal note, to be standing here before such prominent audience within an organisation that is older than I am is definitely an honour.

Ladies and Gentlemen

IOC strives through this IODE programme since 1961 to enhance marine research, exploitation and development, by facilitating the exchange of oceanographic data and information between participating Member States, and by meeting the needs of users for data and information products.

Shared data amongst member states may facilitate policy research among policy makers, practitioners from civil society, beneficiaries and participants of specific policy and programme interventions and researchers, for an informed and advised policy formulation process.

In this regard, Malaysia, as announced by the Prime Minister, during the 2017 budget speech, is set to embark on a new 30-year transformation plan, titled National Transformation (TN50), which will set a new 'vision' for the nation, with the aim to transform Malaysia into a calibre nation state as well as with par excellent mind-set.

In implementing the TN50 agenda to transform Malaysia's economy to be scientifically advanced and for the citizens to be a progressive society, the sustainable development growths are now being integrated into the 11th Malaysia Plan. This is where, the concept of oceanographic data sharing may be characterized to emphasize for instance on technological infrastructure. I envisage, for example in alternative energy source, the characterization could include matters related to specifications for defining common terms across different fields of oceanography and marine science.

Ladies and Gentlemen

9. As the Head Secretariat of the Local Organizing Committee, I would like to acknowledge the assistance rendered by the IODE Secretariat in a ‘hand in glove’ sort of cooperation since last year. My gratitude is also extended to Dr Aidy from University Malaysia Terengganu for his proposal that Malaysia bid to host this meeting. An idea well-conceived. Further acknowledgement is also extended to the top management of Ministry of Science, Technology and Innovation (MOSTI) and other oceanography and marine science stake holders from various Ministries, government agencies and universities, who had also contributed in the planning and organizing of this biennial meeting.

10. I hope you will make the most of your stay in Kuala Lumpur, and take home with you warm memories of your visit. Please allow me to conclude by sincerely thanking all of you for your efforts and contributions.

I wish you all a happy and fruitful meeting.

Thank you.

Annex VI
IODE-XXIV SCIENTIFIC WORKSHOP, 27 March 2017

SESSION 1: IODE CONTRIBUTION TO THE IOC MEDIUM-TERM STRATEGY, SDG

Chair: Cyndy Chandler

1- IOC's new Strategic Plan for data and information management: IODE at the service of other IOC functions (15m) [Greg Reed/Lesley Rickards]

2- IOC and its IODE contribution to Sustainable Development (15m) [Vladimir Ryabinin/ Julian Barbière]

3- IODE/OBIS to support the management of Biological and Ecosystem Essential Ocean Variables (15m) [Eduardo Klein]

4- Panel Discussion/ Questions & Answers (15m)

SESSION 2: INNOVATIVE INITIATIVES IN OCEAN DATA AND INFORMATION MANAGEMENT

1. Introduction

2. Ocean Data Portals and interoperability

Keynote: The need for an IOC global ocean data and information portal [Tobias Spears]

- EMODNET: Patrick Gorringe
- EOOS: Patrick Gorringe
- SeaDataCloud: Michèle Fichaut
- ODIP, IMOS/AODN: Roger Proctor
- WIS (10m): Lydia Gates

3- Keynote: The evolving role of the marine librarian [David Baca, IAMSLIC]

4- Panel Discussion/ Questions & Answers

SESSION 3: IODE and capacity development: how can we better support the IOC regions' capacity development needs

Chair: Yutaka Michida

1. OceanTeacher Global Academy: status and future; collaboration with other training programmes; synergies,... [Claudia Delgado]
2. Capacity development needs at the regional level) [Aidy Muslim]
3. Panel Discussion/ Questions and Answers

[end]